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HOUSE OF REPRESENTATIVES, UNITED STATES.

HEARINGS

BEFORE THE

COMMITTEE ON AGRICULTURE

OF THE

HON. SECRETARY OF AGRICULTURE AND CHIEFS OF BUREAUS
AND DIVISIONS OF THE DEPARTMENT OF AGRICULTURE
ON THE ESTIMATES OF APPROPRIATIONS FOR THE
DEPARTMENT OF AGRICULTURE FOR THE
FISCAL YEAR ENDING JUNE 30, 1907;

ALSO OF

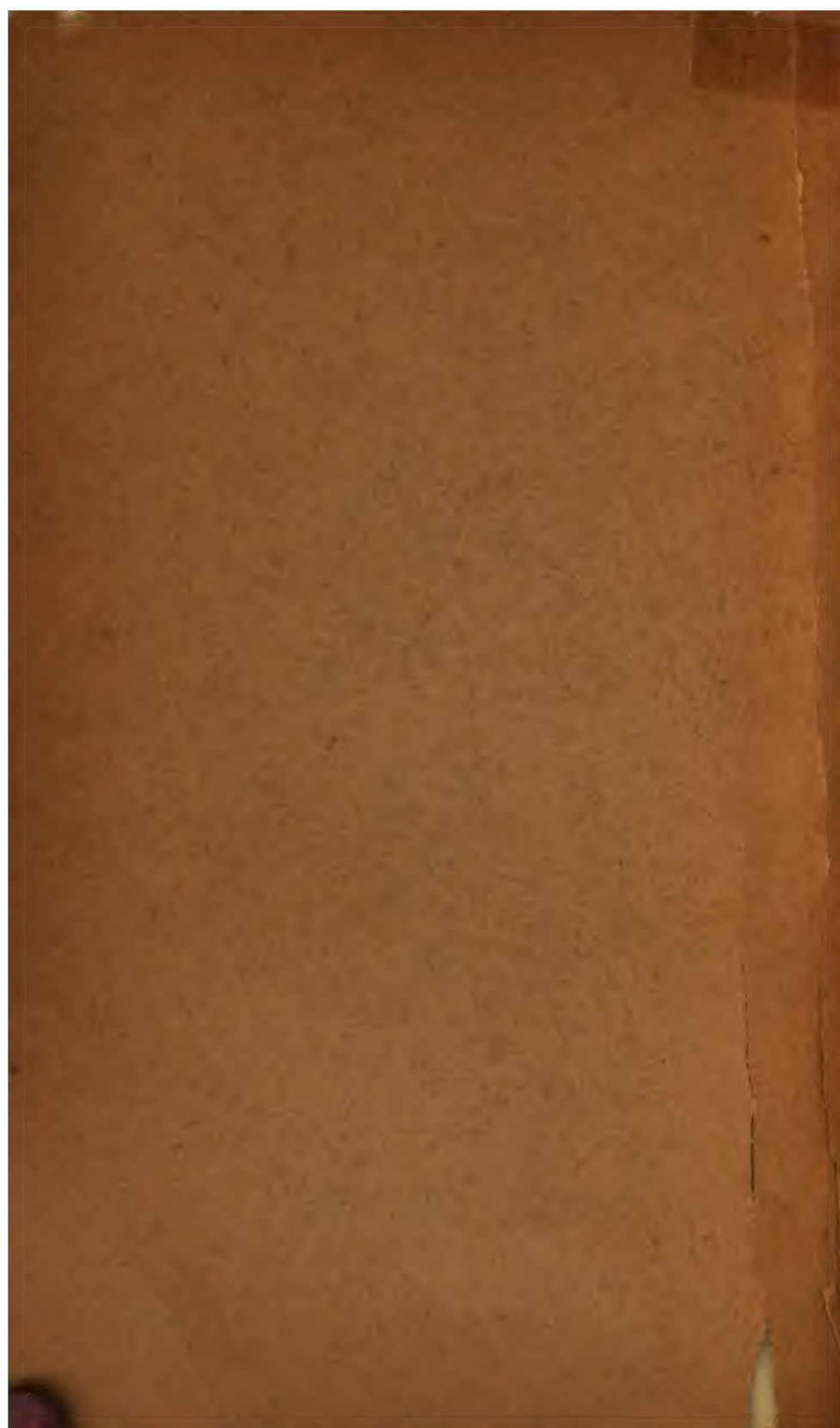
MEMBERS OF CONGRESS AND OTHER INTERESTED PERSONS

ON

BILLS RELATING TO THE DEPARTMENT
OF AGRICULTURE.

FIFTY-NINTH CONGRESS, FIRST SESSION.

WASHINGTON:
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AGRICULTURE APPROPRIATION BILL.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Washington, D. C., Friday, January 12, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth in the chair.

The committee thereupon commenced the consideration of the bill making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1907.

The CHAIRMAN. Gentlemen, we have come together this morning in pursuance of the determination of Wednesday to hear Professor Moore on his items for the work of his Bureau and the expenditure of the appropriations therefor. I think you all know Professor Moore, and it is not necessary for me to introduce him to you.

Mr. ADAMS. I would like to ask a question, Mr. Chairman, before we begin. I suppose it is the purpose of the committee to have all these hearings, and then later take up the bill?

The CHAIRMAN. Yes; the full committee will take them, and then the subcommittee will report the bill, as they frame it, to the full committee; this will enable the whole committee to judge of the situation.

Now, Professor, we shall be glad to hear you in regard to the general work of your Bureau during the past year, and any new things that you have discovered or any new things you have done, and a general statement covering the expenditure of the appropriation, and the reasons for some slight increases that you have asked.

STATEMENT OF PROFESSOR WILLIS L. MOORE, CHIEF OF WEATHER BUREAU.

Professor MOORE. Yes. Now, let me say that the changes in the law of last year that are estimated for are very few. The first is for eight new stations, submitted, and \$15,000 additional for telegraphing.

The CHAIRMAN. You will find this, gentlemen, under the head of the Weather Bureau, on page 3.

Professor MOORE. Let me first say that there are no increases in salaries anywhere estimated for or recommended. I believe that every subordinate of mine is receiving a fair compensation; and we feel that we have been very fairly treated by the committee in regard to salaries, as in regard to all other matters, in fact. So that we are estimating simply for three additional clerks in Washington to do

the additional work that may be involved if you create these eight new stations, or any portion of them.

Mr. SCOTT. Where is the item carrying the eight new stations?

The CHAIRMAN. We have not come to that. We are on page 3. Professor Moore will treat that when he comes to it.

Mr. SCOTT. I merely wanted to get it down so that I could look at it.

Professor MOORE. It is in the general fund, under the head of "Salaries."

The CHAIRMAN. We will take it up in order. The clerks that Professor Moore refers to you will see in about the center of the paragraph relating to his Bureau, on page 3.

Professor MOORE. There is a \$1,200 clerk, a \$1,000 clerk, and a \$900 clerk.

The CHAIRMAN (reading). "Twenty-six clerks of class 1 (increase of one submitted), \$31,200; 17 clerks at \$1,000 each (increase of one submitted), \$17,000; eight clerks at \$900 each (increase of one submitted), \$7,200." Those are the three clerks the need of which the Professor is now explaining.

Professor MOORE. Yes; and, Mr. Chairman, heretofore we have, in the ten years, increased the number of stations by about 30—from about 160 to about 200. In all that time we have never, I think, with one exception, added to the working force at Washington. All these stations require much additional clerical work at Washington, as all their forms and records come here for examination and final compilation.

In 1895, when I came here, the working force at the headquarters in Washington was 201. To-day the working force is 183; and we have always had ample force. We have been increasing the number of stations and not increasing the working force here until we have reached the point where we can not increase the number of stations without adding a little to the clerical force in Washington. That is the point I want to make. I also want to make this point—that I have not asked for any increases in Washington to enable us to keep pace with the increase of the outside service until I felt it was absolutely necessary. On the contrary, for the first two years our working force was decreased (and decreased on my recommendation, if you will remember), carrying it down from 201 to along about 180.

Mr. SCOTT. I noticed that on page 5 of the estimates you submit a decrease of one inspector in charge of Climate and Crop Division. Could you explain just how that is?

The CHAIRMAN. Let us take that up when we come to it.

Professor MOORE. Yes—well, that is under the lump-sum roll.

Mr. SCOTT. I asked that because I thought the Professor was giving us now, preliminarily, a general review of his work.

The CHAIRMAN. I thought he was going to take the items up in the order of the appropriation. That is, employment outside of the city of Washington, Mr. Scott.

Professor MOORE. That was transferred to the lump-sum roll outside of Washington.

Mr. SCOTT. Yes; well, that is all I want to know.

Professor MOORE. He was one of the men that the committee last year agreed to promote. He was on the old roll, and was getting \$2,000 as chief of the Climate and Crop Division. He was finally

transferred to the lump-sum roll by the committee, cut out of the regular appropriation, and placed in a position where it was optional with the Secretary of Agriculture to give him anything up to not exceeding \$3,000. Under that latitude I recommended him for a salary of \$2,750, and the Secretary approved it—not taking the full limit that was allowed by the action of the committee. He is the head of the whole Crop Service of the Weather Bureau. We considered that \$2,750 was a fair salary for him, although he is a very excellent man.

The CHAIRMAN. There is no increase asked in the salaries of the people employed in the city of Washington; the increase is simply of the three clerks that you have named?

Professor MOORE. Yes; and those are dependent on your adding additional stations. If you do not add additional stations we do not need that increase.

The CHAIRMAN. Now we come to "Fuel, lights, and repairs, Weather Bureau." You make no change there?

Professor MOORE. No change—no.

The CHAIRMAN. That has been so for a year or two. Under "Contingent expenses" you make no change. Now the salaries.

Professor MOORE. Wait one minute, Mr. Chairman. Let me look at that just for a second. I think there is a slight change under "Contingent expenses." After the words "purchase of" in the fourth line, there—well, of course your lines do not run with mine; but it says "purchase of horses for official purposes only." After "purchase of," if you will insert the two words "vehicles and," we will have authority to purchase our mail wagons and our delivery wagons that now we are practically running without authority of law.

Mr. HASKINS. After the word "of," change it to read "purchase of vehicles and horses?"

Professor MOORE. Yes.

Mr. LAMB. Where is that, now?

Professor MOORE. It is on page 5, at the top of the page.

The CHAIRMAN. It should read "and purchase of vehicles and horses for official purposes only?"

Professor MOORE. "And purchase of horses and vehicles."

The CHAIRMAN. Well, you said "of vehicles and horses."

Professor MOORE. Either one—"purchase of vehicles and horses."

Mr. COCKS. I would rather have the horse without the vehicle than the vehicle without the horse, if I wanted to get anywhere.

Mr. SCOTT. You do not want to get your wagon before your horses?

Professor MOORE. No; otherwise, if that is not put in there, we will be without authority to purchase vehicles.

The CHAIRMAN. You might state to the committee, for the general information of the members, how that has gone along for years and no one ever noticed that omission of vehicles until now. Just state the case.

Professor MOORE. Yes; under such an authority as this the Chief of the Weather Bureau has for thirty-five years used a horse and a driver and a vehicle. He is on duty 365 days in the year, and he is on duty every night until 11 o'clock. The office of the Chief of the Bureau is about 2 miles from the Department. He also holds a commission as acting secretary, which brings him to the head of the

Department anywhere from one to two months a year, as acting secretary. Then he travels back and forth. Now, he has a great need for a horse or vehicle of some description, and up to this last year it was always ruled that the authority to purchase horses carried with it the authority to purchase vehicles to go with them, and authority to have them driven and cared for. But since that special act of Congress that went through last winter, saying that unless a carriage or a vehicle or a horse is specifically appropriated for it can not be purchased, none of this money, under anyone of these bills, can be used in that way. You will notice that neither a carriage nor a wagon nor a vehicle is specifically appropriated for, but a horse is.

Mr. HENRY. As I understand, Congress is directly responsible for this change, and not the Comptroller?

Professor MOORE. Yes.

The CHAIRMAN. Well, Mr. Henry, this bill has read that way all the time. We have never noticed it; that is the odd part of it. We have never noticed that it did not carry a vehicle.

Mr. HENRY. It would do so under the ordinary form of construction.

Professor MOORE. I will say this: If you insert the word "vehicles" it is also going to give me the authority to use one of those horses for myself for my official work. The question is if the committee want me to do that. Heretofore, I believe, they have been in favor of my using a Government horse.

Mr. HENRY. I thought you had had a horse and carriage.

Professor MOORE. I always have had, and all my predecessors have had, for thirty-five years; but I am saying now that last winter—

Mr. HENRY. That act that was passed last winter deprived you of the horse and carriage?

Professor MOORE. That act did.

The CHAIRMAN. Because he had no vehicle.

Professor MOORE. Because our appropriation bill has always said "for the purchase of horses," and never said anything about the purchase of vehicles.

Mr. HENRY. What have you done since? Have you had to ride on the street cars?

Professor MOORE. I have used a bicycle and hired horses, and between the two have gotten along the best I could.

Mr. COCKS. If you had bought the horse and hired the wagon, that would have been a good deal cheaper.

Professor MOORE. I could have done that; I could have bought a horse and used a Government wagon. But as the thing was open to question, I concluded not to do that for what you might call my own personal use, until that matter came up before the committee, so that I might see what the committee wished me to do about it. If you put the word "vehicles" in there, with no restrictions, I shall have the authority to use a horse and carriage.

Mr. HENRY. I think that ought to go in.

Professor MOORE. Now, you may limit that. You may provide over here a little further that not more than a certain amount of that money shall be used for the maintenance of a vehicle and a horse for the use of the chief. You can limit that if there is any question about that. It will cost about \$1,200 to maintain that horse and vehicle.

A driver gets \$60 a month, and then there are the items of feed and repairs. It is an expense of about \$1,000 or \$1,200 in all.

The CHAIRMAN. About \$100 a month—\$85 a month anyway. Now, the next item, Professor.

Professor MOORE. What do you want to come to next, Mr. Chairman?

The CHAIRMAN. "Salaries, station employees, Weather Bureau"—that is, outside of the city of Washington—you have raised \$20,000. The note says: "Increase of \$20,000 submitted to cover salaries of employees required to establish and maintain eight new stations." That is dependent also upon whether, farther on, on page 6, under "General expenses of the Weather Bureau," we provide for the eight new stations.

Mr. ADAMS. Before we get to that, Mr. Chairman, I would suggest that we take up the matter of the stations themselves. This would follow that very logically. I would like to know why these eight new stations are provided.

The CHAIRMAN. Very well. That is not the order of the bill, but I think Mr. Adams's suggestion is correct.

Mr. ADAMS. I would like to ask Doctor Moore this question: Of course, as a matter of personal comfort and work, and all that sort of thing, the establishment of these stations is a matter of indifference to you. As the head of the Weather Bureau how important do you regard the establishment of these new stations, and where do you propose to establish them, and why?

Professor MOORE. That will have to be answered in several ways. I have just sent for a book in which I have a list of all the important requests for stations, and the number that we have declined to recommend to the committee. Out of the list there are eight requests that might receive favorable consideration.

The CHAIRMAN. That is a list of proposed new stations?

Professor MOORE. Proposed new stations; yes. I think I can give them to you largely from memory.

(At this point Professor Moore telephoned to the Weather Bureau for the book above referred to.)

Professor MOORE. I will say that great pressure has been brought to bear for the creation of Weather Bureau stations by many cities that are not of sufficient commercial importance to justify their establishment, as far as the needs of the cities themselves are concerned. We will take, for instance, a case like Tonopah—and Tonopah is one of those places at which I would like to establish a station next year, if you provide any new stations. It is in the south-central part of Nevada. There is an open country in any direction for a radius of 300 miles to the nearest station, possibly more. We would like an observation right in that center if we can get it. It will be of benefit to the service farther east and to the country farther east. But there is nothing in Tonopah that needs a station. We need the station, not Tonopah.

Let us take the converse of that. We will come over to a place like Fort Wayne, Ind., for instance, which is one of the places asking for a station. Fort Wayne has a population (I have forgotten the exact figures) of, I think, seventy-five to a hundred thousand people; about 100,000. It has good railroad facilities. Its proximity to our other

stations is such that we can get along without an observation from there, so the service at large does not need especially a station at Fort Wayne. But the commercial interests of Fort Wayne think that this meteorological data, in the form of a weather map, ought to be put before their board of trade every morning, and that they ought to have a meteorological chart distributed to their people the same as at Toledo and at Cleveland, and they believe that with their railroad facilities they are a good distributing center from which reports can be printed and distributed.

There is a local community that feels as though its interests are such as to justify the creation of a Weather Bureau station. Over in Tonopah there is a local community whose business interests are not such as to justify the expenditure of the amount required to establish a station. There are two illustrations of the different classes of requests.

Mr. ADAMS. Looking at the question purely from a meteorological standpoint, which would you regard as the most important?

Professor MOORE. For our purposes, Tonopah would be the most important. I will take another case—that of Sandy Hook, N. J. The New York Maritime Exchange, the Philadelphia Maritime Exchange, and the Baltimore Maritime Exchange have been asking to have a small observatory building erected on Sandy Hook and a small meteorological station maintained there, although it is only a few miles from the New York station.

The CHAIRMAN. From what station?

Professor MOORE. From the New York station. They are asking for this station in the district of Sandy Hook, down the bay.

Mr. HENRY. Does any advantage accrue to the service from having a station there, with another station so near?

Professor MOORE. Very little to us, but a great deal to the commerce of New York. That is the way they look at it. In the first place, so many admiralty cases occur in the entrance to that great harbor by collision, wreckage, and one thing and another that they want a Government record of the direction of the wind and the force of the wind that can be used in those cases.

Mr. ADAMS. A record of the force of the wind at that point?

Professor MOORE. At that point. It is the predominating evidence in most of these admiralty cases. They also want that station to display the danger warnings for the marine traffic in and out of the harbor. But the main reason they want it is to get an absolutely accurate and reliable meteorological record for the admiralty cases. That is the principal object of that station. It will require a building and require one man only.

Mr. ADAMS. How much will the building and the site cost?

The CHAIRMAN. Is there a place on the Government reservation there where you can put the building?

Professor MOORE. We can get the ground on the reservation, and it will only require one man. That building will not be as expensive as the stations usually are. We can probably put up a building there for \$8,000, unless there is some trouble about the expense of the material. If the contractors hesitate to bid, and go away, then we have to pay more.

The CHAIRMAN. What weather observations would you get there that you could not get in New York?

Professor MOORE. We would get a better wind record. We put that on our charts at New York and Boston.

The CHAIRMAN. Where is your office in New York now?

Professor MOORE. It is about 100 Broadway.

The CHAIRMAN. Away up on top of one of those tall buildings?

Professor MOORE. Yes.

The CHAIRMAN. Would you get a better wind record at Sandy Hook than you would there?

Professor MOORE. Yes; over the free water we will get a higher wind velocity, and it will be a little different from that at New York.

The CHAIRMAN. From the other point of view, would it be better from there than from New York?

Professor MOORE. No; we will have to maintain one at New York, too.

The CHAIRMAN. From a meteorological point of view?

Professor MOORE. From a meteorological point of view the record at Sandy Hook would be better for our work than that over in New York; but we must have a station at New York itself. We must have an office right in the business center, where the press representatives can come in, and where the commercial interests can come in.

There is a continual stream of visitors to that office all day long getting data, and our telephone is ringing constantly. We keep a man busy at the telephone all the time answering inquiries. The office has to be downtown. If it were not for that, we would establish our office up at Columbia University; we would erect a building on the campus up there.

The CHAIRMAN. Could not that be accomplished by wire from Sandy Hook without establishing a regular station, by a man located there?

Professor MOORE. If we put a man there, we have to furnish him quarters and furnish him an outfit of instruments. They want full observations there.

The CHAIRMAN. That news is required by the steamships in New York up the harbor, is it not?

Professor MOORE. Yes.

The CHAIRMAN. You would have to telegraph the news anyway?

Professor MOORE. Yes.

The CHAIRMAN. They would not get the news direct from the station at Sandy Hook; they would get it from a New York station, transmitted from Sandy Hook?

Professor MOORE. Yes.

Mr. SCOTT. I should think the most important work of that station on Sandy Hook would be to fly signals for the outgoing vessels.

Professor MOORE. That would be one of the important things; but if that were the only need we had for the station, Mr. Scott, we could put a tower there and hire some one living on the island to hoist the signals and pay him \$10 a month for doing it. That we could accomplish very easily. But it is the accurate meteorological record that the maritime interests want taken down there. I think that is a request which deserves action.

Mr. COCKS. The farming interests are concerned, too?

Professor MOORE. Yes; that is another consideration.

In that connection, here is an insert that I would like to bring to your attention. It is appropriate right now, and it is this:

There is a special law that applies to the Department of Agriculture that prevents us from hiring an employee of another Department. For instance, at many of these outlying places, like the Farallone Islands, or like Sand Key, down off Key West, there is no one there except the light-house keeper or a member of the life-saving service. If we could hire him and pay him \$10 a month as our display man, we could get good service from a man who is already there, who is compelled to be there, and who could serve us. But there is a special law applying to the Department of Agriculture which does not apply to other parts of the governmental service; and that law prevents us from hiring or paying a salary to any employee of another Department.

Mr. SCOTT. Is that a part of the appropriation law, or is it a separate statute?

Professor MOORE. A separate statute. Here it is: "Section 3. That no part of the money herein or hereafter appropriated for the Department of Agriculture shall be paid to any person as additional salary or compensation receiving at the same time other compensation as an officer or an employee of the Government."

The CHAIRMAN. That was incorporated in one of the appropriation bills.

Professor MOORE. I want to suggest the insertion of this language: "And the Secretary of Agriculture is hereby authorized to pay employees of other branches of the Government service for services in the taking of meteorological observations and for the dissemination and display of weather forecasts and warnings, provided, that compensation to any one person so employed does not exceed \$25 per month."

The CHAIRMAN. Professor, was not the first clause that you read inserted in the bill last year?

Professor MOORE. No.

The CHAIRMAN. The first clause, the prohibitory clause?

Professor MOORE. No, no; that went through in Mr. Morton's time.

The CHAIRMAN. It was carried in the bill?

Professor MOORE. They made a general law to hit one particular man.

The CHAIRMAN. It has been carried in the law ever since; it is not a separate statute?

Professor MOORE. No; but it is the law now.

I will give you an illustration here of what I mean. General Greeley has his Signal Corps men up in Alaska operating the telegraph lines there. We shall soon want to be getting electrical observations from Alaska. Their region is broad enough so that we could probably give them warning of their cold waves. If I could take General Greeley's Signal Corps sergeants who are running the telegraph offices and equip them with a very simple observatory at an expense of two or three hundred dollars, and give them a little additional salary, I could get all the reports I want from there without sending a ten or twelve hundred dollar man from here, and without any elaborate expense.

The CHAIRMAN. Does not that apply to Sandy Hook, Professor? Has not General Greeley got Signal Service men there?

Professor MOORE. No; it does not apply there. The point is this: Of course, it may seem like bad policy to pay a Government employee two salaries; but if the Government employee is getting but a small salary in one department, say thirty or forty or fifty dollars a month in the Life-Saving Service, the Treasury Department is, as a rule, rather loath to have him take up and do our work. But there may be men connected with other parts of the Service, and sometimes they are in the Life-Saving Service, who could do our work and save us the expense of sending a high-salaried man there. If we could simply allow them a few dollars, ten or fifteen or twenty dollars or whatever it might be—I am just explaining why we ask you to give us that authority—I think we could use the money very economically; and I limit the amount that we could pay to any one of those employees.

We can get along all right without that authority, but we could save money if we had it. In a number of cases now we do evade the law a little bit. Suppose we want the life-saver or the light-house man to attend to our signals. He is probably the only man there. We can not pay him, so we employ his wife. But that is a species of juggling. We employ his wife to get around this very law, because he is the only man there is there to do that work; and we ought not to be compelled to evade a law. We ought to stand squarely up to the law.

That is all I have to say about that, Mr. Chairman.

Mr. BOWIE. You have explained about the necessity for a station at Tonopah and at Sandy Hook, and about the desire for one at Fort Wayne. Have you in mind any other stations that you regard as important from the governmental standpoint?

The **CHAIRMAN.** From the scientific point of view, meteorologically?

Mr. BOWIE. Yes.

Professor MOORE. There is Devils Island, in the north end of Lake Superior—one of the Apostle group. We have just submitted a supplemental estimate of \$22,000 to connect that island by cable with the adjacent south shore line, in response to the demands of the marine interests of the upper lakes. A big vessel was lost there not long ago; and if the island had been connected by cable with the mainland we would have had a station there and could have called help and could have saved that vessel and all the lives that were lost. Then the marine people say that if we had a weather station on that island it would be able to report the passage of all this great commerce going into Duluth, about four or five hours ahead of its arrival, and in that way they could prepare for the dockage of the vessels. Then we would display storm warnings for the vessels that go up there; and there are a good many wrecks occurring in that vicinity, so that the island ought to be in communication with the mainland. They desire that it be done. That is another case where a station might be erected.

The **CHAIRMAN.** That station would be open only about seven months of the year?

Professor MOORE. It would be run only during navigation—about seven months of the year.

The **CHAIRMAN.** What would you do with the man assigned to it for the rest of the year?

Professor MOORE. Oh, we would close the station and assign him to some other station for work.

The CHAIRMAN. Would it be a one-man station?

Professor MOORE. No; we would probably have to have an assistant from some other station.

The CHAIRMAN. Is the island inhabited?

Professor MOORE. Yes; there are some light-house people there.

The CHAIRMAN. Light-house people?

Professor MOORE. Yes; there are some light-house people on the island.

The CHAIRMAN. Could that be done in connection with the Light-House Service, if this item was inserted in the bill?

Professor MOORE. No.

The CHAIRMAN. It could not?

Professor MOORE. No; that would be a pretty expensive station. We would have to keep at least two men there, for someone would have to be on duty all night. We would have to keep a continuous watch; and I find that if you keep a man on duty for as long as twelve hours he will get negligent. We usually have to divide them into three watches, as we do down at Sand Key, reporting the commerce going into the Gulf.

The CHAIRMAN. What warning could that station give the marine service? The vessels would have to come in view of the island, would they not?

Professor MOORE. It is right in the fairway of vessels. That island is right in the fairway. They all pass near the island in going to and from Duluth.

The CHAIRMAN. Down to the Sault Ste. Marie?

Professor MOORE. Yes. To be sure, they have gotten along all this time without it. I think, however, that a station there could be used with profit.

Lansing, Mich., is another city that would like a station. They would like to have a new station building built on the campus of the university there, and they offered us ground for the purpose on the campus. Lansing is pretty near the middle of the State, and for scientific purposes an observation there would be useful. But we can get along without it. That is about the way of it—we can get along without it.

The CHAIRMAN. For scientific purposes it would be useful?

Professor MOORE. It would be useful.

Canton, N. Y., is of course a small place; the St. Lawrence University is there; but there is an open stretch of territory in that part of our country where we have no station. A station there would aid us, and would increase the accuracy of our predictions for New England.

The CHAIRMAN. What country would it warn?

Professor MOORE. It would give us a measurement that would help us in making predictions for the New England coast and for as far south as Massachusetts. There are no local interests there that especially need a station, except that little university, and if we go there we will undoubtedly get quarters free, right on the grounds of the university, and put a station there.

The CHAIRMAN. At Canton?

Professor MOORE. Yes; at the St. Lawrence University.

Mr. BOWIE. Is that in St. Lawrence County?

Professor MOORE. I do not know what the county is.

The CHAIRMAN. Yes; St. Lawrence County.

Professor MOORE. It is up there in the northern part of the State. I wish I had my book here; I have a complete record of it in the book.

The CHAIRMAN. It will be here before long.

Professor MOORE. Pretty nearly everything else is here except the thing I want.

Mr. BOWIE. You can recur to it.

Professor MOORE. Now, in that book of fifty requests there are not to exceed eight that we especially recommend on the ground of the importance of the local commercial or marine interests, or on the ground of the scientific interests of the Department. There are eight that could consistently be established.

Mr. BOWIE. Professor Moore, when do you think that, in the development of this service, you will reach a point where you can stop estimating for an increase in the number of stations?

Professor MOORE. I do not think that time will quite ever come, for the reason that what is to-day a village will be a city ten or fifteen years from now, and may have enough commercial interests to want a weather report and a daily map. Most of them want a glass map right in their board of trade room.

The CHAIRMAN. That does not involve the establishment of a station, does it? It perhaps involves having a man there to look after these maps; but then you simply have the telegraphic connections from that station to the westward, or wherever your storms come from, to notify the station, do you not?

Professor MOORE. No. It involves, in the beginning, the printing of a daily map and the telegraphing of reports, and that involves having an office and a printing force.

The CHAIRMAN. It does not involve a building, does it?

Professor MOORE. Not necessarily.

The CHAIRMAN. I thought you telegraphed those things to the board of trade and hung these cards up there.

Professor MOORE. No. A map like you have in the lobby here must be made by an expert. The data must be telegraphed to the local station in order to make up a map like that.

The CHAIRMAN. These things are established in the board of trade rooms, are they not?

Professor MOORE. Yes; they are displayed in the board of trade rooms.

The CHAIRMAN. I mean they are displayed there.

Professor MOORE. But if a city is important enough to have a board of trade which we would supply with a glass map we would also print that same data on maps of this size [indicating] and mail them to the surrounding post-offices. So there will have to be a gradual addition to the number of stations each year, I presume, for as long as the country continues to grow. But the great, the most important thing, is to stop the growth of the weather service—or, rather, to permit its growing too fast.

Mr. BOWIE. Do you think that you could get along, really, if we cut this increase down to four? I am not advocating cutting it down, you know.

Professor MOORE. Of course, I am just discussing these things with you. I could get along if you did not provide for any of them, and

it would not worry me at all. But I think that you ought to create at least four stations; I think it would be good policy to create not less than four or five out of those eight, and I am simply saying that out of all those requests, there are but eight to which I would be willing to give a favorable recommendation. That is the point I want to make. We are ready, of course, to create any of those eight that you gentlemen tell us to go ahead and establish.

Mr. HASKINS. Which of the eight is the most advisable?

Professor MOORE. I think I can answer that better when I get my book here.

The CHAIRMAN. Just make a note of that question, Mr. Haskins, and ask it when the book comes.

Mr. LEVER. I understand, Professor Moore, that you think the establishment of these eight stations would not especially help the service, but would be of benefit to the business interests of the country?

Professor MOORE. Yes; they would get a benefit from it. Let me take a place like Hannibal, Mo., as an illustration. A station was put in there. It was our opinion that the station did not justify the expenditure; and I know I asked authority from the Secretary of Agriculture to close it. He gave me the authority, and I proceeded to close it.

The commercial interests there, and especially the river interests, protested. I said: "No; you are too close to Keokuk. You are only about 40 miles from Keokuk, and we can not maintain a station here." Then they made such a plea that I made a thorough inspection of the station, and I was surprised to find that a city of only about ten or twelve thousand people, or less, could get such a material benefit from the weather service, at least when they came to know it and to utilize it. The result is that we have left the station there; and the same thing applies especially where there are river interests or maritime interests. And there are many cases where rather a small city, a city with a population of from ten to twelve or fifteen or twenty thousand, may be so located in the center of a rich agricultural region or an important fruit region into which you want to telephone and telegraph your frost warnings and cold-wave warnings, that would get a benefit from the service that would largely justify the Government in establishing a station there. But it is not every city of 10,000 or 20,000 or 30,000 that has interests that are directly benefited by the weather service; and it is those cities that we must keep from getting stations, I should say.

The CHAIRMAN. Right there, Mr. Moore, on the question of stations, please explain to us the difference between the appropriation carried for the additional stations and this one here [indicating on page 4]. They seem to be identical.

Professor MOORE. Oh, yes; there is an important difference. The Secretary has agreed to my making this sort of a recommendation: that in case you appropriate at all to create a station, you carry with it an appropriation for the purchase of the ground and the erection of the little observatory building. Otherwise, do not create the station.

Mr. BOWIE. That would not apply in the case of one station you mentioned a while ago, where you said you thought the university would furnish the building?

Professor MOORE. There it would not apply—there we would utilize it.

Mr. BOWIE. What is that one?

Professor MOORE. That was the St. Lawrence University at Canton. The reason I said that was that I know they are erecting a science building there. Carnegie is putting up a fine building for them, and they have already offered us to construct the roof so that it will be suitable for our purposes. So that I know that we can get quarters there free.

Mr. BOWIE. The general proposition, however, is that if we wish to permit the construction of a new station, we should at the same time provide for a building for it in order to save the embarrassment and trouble and expense of renting?

Professor MOORE. Of renting, first, property in quarters not suitable for our scientific purposes; and, second, to avoid being compelled to pull out our instruments and change their elevation, which is always detrimental to the service. When we rent a building there is always a chance of another building of greater altitude coming right up beside it, you see; whereas when we erect a building ourselves we get enough ground around it to protect it, and we get a proper exposure for our instruments. We put one man in the building and give him quarters, heat, and light, and he will do the work of one and a half men on an average. That is because of his being right in the building where he attends to his instruments, which are working twenty-four hours a day. Then we pay him less salary because he gets those allowances.

Mr. BOWIE. In other words, you commute the value of the quarters and allowances?

Professor MOORE. Yes; and we get a profitable investment out of a little observatory building in that way.

The CHAIRMAN. But do you get him for less salary, Professor? Are not these salaries maintained at certain figures? For instance, take the man at Duluth—I happened to see that building.

Professor MOORE. Yes.

The CHAIRMAN. When that man had those quarters furnished for himself and family, did you reduce his salary?

Professor MOORE. I will tell you about that: In nearly every case we have cut the salary of the man when we put him in a place of that kind.

The CHAIRMAN. When you have given him quarters for himself and family?

Professor MOORE. Yes; in almost all cases. Duluth is one case in which the salary was not cut, for this reason: That man was about to be recommended for promotion. The man in charge of the Milwaukee station was then getting \$2,000, the man at Cleveland \$2,000, the man at Erie \$1,500, and the man at Columbus, Ohio, in charge of climate and crops, \$1,800. This man had served the necessary length of time and had made an excellent record, and I was about to recommend him to go to the \$1,800 grade. I held that recommendation up, because about that time we decided to construct a building there that would give quarters, fuel, lights, etc. He is the head man of that big office, and he is a very efficient man.

So there was a man whose salary was not reduced when he went in there. But all through the West these men that maintain these

little simple observatory plants, and do not print any maps or bulletins, get \$1,200 if they do not live in the building; if they live in the building we give them \$1,000.

The CHAIRMAN. In other words, the building is somewhat of a good investment?

Professor MOORE. There is no question about that.

The CHAIRMAN. And you always take that into consideration in fixing the salary?

Professor MOORE. Yes; we take that into consideration in fixing the salary. In every case the amount of money invested in the building at 4 per cent is a good investment if you compare it with the rent that we would have to pay before; and before we would get improper quarters, and now we get perfect quarters; so that it is a good business proposition.

The CHAIRMAN. Of course a man who moves into one of those buildings gets his fuel and light and also gets the use of the building?

Professor MOORE. Yes; he gets fuel and light and the use of the building. I modeled that very much on the order of the army regulation; and one of the questions we took up was whether we could allow the man to have fuel from the Government for his own cooking stove, for his own heating, and his own apartments. I concluded that I did not want to have two coal piles, and have this man going to one for the Government's heat and then going to the other right beside it for his own cooking; for I did not want to subject a man forever and ever to the temptation to use the Government's coal pile.

So we fixed that and simplified the whole matter by simply giving him his fuel, all he wants, within reason; and we fix his salary, the amount he is paid, in consideration of the fact that he is getting these allowances.

The CHAIRMAN. Now suppose you explain what is seemingly a duplication here. Under "General expenses, Weather Bureau," you will find, in italics, the words "including the purchase of ground and the erection under the supervision of the Chief of the Weather Bureau of not to exceed eight additional observatory buildings." That is for the establishment of absolutely new stations?

Professor MOORE. That is to erect the eight buildings for the proposed eight new stations.

The CHAIRMAN. The proposed new stations—absolutely new stations?

Professor MOORE. Yes, sir.

The CHAIRMAN. And the other appropriation on the top of the page is the appropriation for buildings on established stations?

Professor MOORE. Yes. Here, on page 7, is the paragraph which carries five stations that are to replace old stations, to be established where there are already stations.

Mr. BOWIE. Where you are renting?

Professor MOORE. Yes. Now, I have included \$12,000 for each one of those stations. Heretofore you have allowed me \$10,000. The gradual increase in the cost of everything is such that I have had to cut out from nearly every one of my old specifications the interior trimmings and fittings that ought to go into the buildings. We can not put them in for the price.

The CHAIRMAN. Lumber has gone up?

Mr. BOWIE. Labor has gone up, too, in some places.

Professor MOORE. If you only want to create five of these new stations, Mr. Chairman, you should cut off \$36,000 of that fund—\$12,000 each for three of those buildings. You should also cut off \$7,500 for salaries for three stations.

The CHAIRMAN. I understand.

Professor MOORE. And then, if you cut off buildings here and wanted to add them over there, you could do it. I think that the construction of those small buildings is a good investment.

The CHAIRMAN. It is a first-rate investment, if you take it into account in fixing salaries.

Professor MOORE. We do, absolutely, Mr. Chairman, and furthermore, we get more work from the man by having him constantly on the premises.

The CHAIRMAN. You ought to save 5 per cent on that investment.

Professor MOORE. Oh, we are getting 10 per cent. We get a great deal more than 5. You see, for instance, these observations have to be taken up to midnight, and in some places, again, they have to be taken at 4 o'clock in the morning. There are many of those places where I keep two men, but if I had a man constantly on the premises, he could get up and take the 4-o'clock reading and telegraph it, and go back to bed again. So that we can get him to do the work of another man simply by giving him quarters.

The CHAIRMAN. If the salary is taken into account, it is a good investment.

Professor MOORE. I assure you that it is, and I can show you case after case in which reductions in pay have been made right along where these men have been put into public buildings, unless there were some exceptional circumstances, as in the case at Duluth.

Mr. FIELD. Professor, in the case of applications for the establishment of stations that are of no special value to the Government, why would it not be a good idea to require of the cities applying for them, as a condition of locating the stations there, that they provide buildings suitable for the purpose? That would diminish the number of applications, would it not?

Professor MOORE. We do exact of them now that they give us the ground. Your authority here is for the purchase of ground and the erection of buildings, if you will notice. There are some places where we can not get ground, and where it is highly beneficial to the Government to put the building there; but as a rule we can make the city give us the ground. We have ground offered to us in most places, in more places than we can build stations; so that as a rule we do not use that authority for the purchase of ground, and in most cases I can use the money for the erection of the building. Sometimes I can put up a building for \$8,000; sometimes it costs \$15,000; and I have always returned what we have not used.

If you will look at my annual report you will see this statement, which I did not include in this statement here—that deficits had formerly occurred in the Weather Service for a great many years. I believe a deficit is a thing that should not occur in a Government office; and you will notice in the last ten years I have always had a surplus. You may say that that is an argument why my appropriation should be reduced. To a certain extent it is. I have always turned back anywhere from \$71,000 to \$13,000, \$5,000, \$9,000, \$8,000, \$7,000, \$1,500, \$2,000—the smallest amount I ever turned back was

\$1,500. Now, you can not always tell just what it is going to cost to run a big service like this. When you start you can not always tell what your expenses are going to be in the last three months, with two hundred stations working, and with a liability of tornadoes or something of the kind coming on that will necessitate a lot of telegraphing to every city in the land. Something of that kind may happen in the last ten days of the year; so, to provide for things of that kind, we always keep a little surplus on hand.

But the point I want to make is this—that when we get close to the end of the year, and see that we have a surplus of two or three or four or five thousand dollars, if there is anything that we think we honestly need, we buy it; and if we do not, we think probably you people will think a little bit more of us if we put it back in the Treasury. And that is what we have been doing.

Mr. FIELD. Professor, is it the policy of the Bureau generally, in almost every instance, to require that the land be furnished?

Professor MOORE. There is no rule. We treat each case as it comes up; but in many of the cases—most of the cases, I think I may say—we have had the land donated to us.

Mr. FIELD. This provision, then, is only to be used in case the necessity requires it—where it is absolutely necessary to have a station? Where it is necessary to get land for the good of the public service, then you want the authority to buy land if necessary?

Professor MOORE. Yes.

Mr. FIELD. But unless it is necessary for the public service, of course, you would require the land to be furnished?

Professor MOORE. Yes; that is what we have done. But the authority is there, so that we can buy the land if we want to.

The CHAIRMAN. At Sault Ste. Marie, for instance, you built on the Government land, did you not?

Professor MOORE. Yes; we built on the Government land there. We got that transferred to us.

The CHAIRMAN. Have you not a station on Government land at Atlantic City also?

Professor MOORE. Yes; we built on Government land there. I am running that station with one less assistant than I have at other climate and crop centers, because of the fact that I can give quarters to two men right in the building, and they are right on the ground all the time.

Mr. FIELD. Is that on the point of ground where the light-house is?

Professor MOORE. On the point of ground where the light-house is—right in the light-house square.

Mr. SCOTT. That is also a good argument in favor of the erection of a building, when you can save the salary of one man in one year.

The CHAIRMAN. Yes.

Mr. BOWIE. Now, Professor, before you go any further into the question of new stations, I want to ask you a question about the five buildings at the old stations. How many old stations have you that, in your judgment, ought to have new buildings? Some, I apprehend, ought not to have them, as a matter of economy—at least, there is no present necessity for them; but how many would you say constituted a present necessity, or, at least, an advantage?

The CHAIRMAN. For another year?

Professor MOORE. You will see this: There are many cities, like New York City, where it will be impossible for us ever to erect a building of our own.

The CHAIRMAN. I should imagine that it would be impossible in any of the very large cities, like New York, St. Louis, Cincinnati, and those places.

Professor MOORE. But it would be impossible for me to superintend and construct during the coming year all the buildings that might advantageously be constructed. We would do better to build slowly and do well, and be sure that we are right as we go ahead. We now have 35 stations equipped with our own buildings. We have 200 stations. I presume that there are to-day 40 cities where we could put up buildings and make a decided saving in our expenses, and at the same time get better service and get better exposure for our instruments. Of course, I would not want to be held down to exactly that figure. I should say, offhand, that there were 40 places of that kind. I could not build more than 10 of those buildings in a year—10 or 12—to the best advantage.

The CHAIRMAN. Have you adopted a general model for all of them?

Professor MOORE. Pretty nearly a general model. We have adopted a small model for a station at which we never expect to publish a daily map—for instance, such a station as we would erect at Tonapah and such as we have at Modena, Utah, much smaller than the Duluth building. The Duluth building is the best building we construct.

The CHAIRMAN. How much does a building of that class cost, Professor, if you recall now? About \$8,000?

Professor MOORE. No; that building ran us over \$10,500—nearly \$11,000. You see, we are up on a hill there, and we could have built down in the city quite a little cheaper than we could build up there. We are up on a bluff about 400 feet.

The CHAIRMAN. Yes; you are quite a way up.

Mr. BOWIE. Let me ask you this question before it goes out of my mind: You think there are ten places where stations are already established where you can build satisfactorily in a year, do you?

Professor MOORE. Yes.

Mr. BOWIE. You have in the past been getting authority for five?

Professor MOORE. Yes.

The CHAIRMAN. Five every year?

Mr. BOWIE. Yes; I understand.

Professor MOORE. It would suit me perfectly if you were to take three or four of those new stations out.

Mr. BOWIE. And turn the money into buildings on old stations?

Professor MOORE. And cut out the \$5,000 for the creation of the stations, \$2,500 for salaries under salary expenses, and \$2,500 for salaries under general expenses, which would be \$5,000, and then transfer the amount for the building over to this fund here.

The CHAIRMAN. And increase that number up to six or seven or eight?

Mr. BOWIE. Or ten, he thinks he could build.

The CHAIRMAN. Well, in a year; yes.

Professor MOORE. Ten would be all we could handle. Now, as to Sandy Hook; Captain Parsons, the president of the New York Mari-

time Exchange, was promised that we would give this case our first recommendation if Congress appropriated for any additional stations.

The CHAIRMAN. Sandy Hook?

Professor MOORE. Sandy Hook. Then the Lansing, Mich., Agricultural College, 3 miles from the city—we have said that they have a good case, and that we would consider it after Congress had decided how many stations it would create.

We want a station at Tonapah. Congressman Van Duzer was very anxious for that two years ago, but we have not built there. We ought to have a station there, however.

Now, Mount Washington and Pikes Peak—those stations are of some interest, and we would like them recreated; but at the present time we do not see the need of those stations. There may come a time when, as a result of the extension of our service, we could utilize stations at Pikes Peak and Mount Washington, but not now.

Here is Sheridan, Wyoming—there is a station we need. It is in northeast Wyoming. It is a good, thrifty place of ten or twelve thousand people, and it would be a very advantageous location for a station.

The CHAIRMAN. What place is that?

Professor MOORE. Sheridan, Wyoming. Representative Mondell is quite interested in that.

The CHAIRMAN. It is absolutely a cattle country out there.

Professor MOORE. Yes; but there is a wide open stretch there, and an observation from there would be very valuable to us in giving warning of cold waves down in Kansas, and farther down in Texas.

Canton, New York, the St. Lawrence University—that has a good claim, I should say.

Now, at Torrence, N. Mex.—a station might be used there.

Corona, Colorado—that is a mountain station, on the divide that the railroad goes over. The railroad is very anxious for us to put a little station there; but there is nothing there but a station. I think it likely that an observation from that mountain could be used by the Denver man, but it would only require what we call a station agency, \$25 a month expense, and about three or five hundred dollars equipment, to get that.

Devils Island, in Minnesota, is a case I have told you about before. That has a good claim. So has Fort Wayne, Ind.

Now we come to Winona Lake, Ind. It is our opinion that a station there would not be justified.

Mr. BOWIE. Do not mention those that you do not think justified, but those that you do.

Professor MOORE. Very well, then. If any of you want to examine that book, you can see it; and there is my opinion in regard to those proposed stations. Here is the list of the places that want stations that I am not ready to recommend, and probably never will recommend. I want you to see the fact that we are not recommending to this committee every application that comes to us for a station. We are all the time saying that we do not need stations.

Here are places where we now have stations at which we think it would be advisable to erect buildings next year:

Birmingham, Ala.—They have already given us a beautiful site there. The city offered us heretofore one or two sites that we would not have, thinking that we could get something better.

Columbia, Mo.—

The CHAIRMAN. Before you leave Birmingham, how far from Birmingham is the nearest station you have?

Professor MOORE. That is an old station—about 75 or 80 miles; say between 80 and 100 miles.

The CHAIRMAN. At what place is it; do you remember?

Mr. BOWIE. I will tell you; it is at Anniston.

The CHAIRMAN. Is it Anniston?

Professor MOORE. Montgomery on the south and Anniston on the east are about equidistant, I should say, from my recollection of the geography.

The CHAIRMAN. Anniston on the east, you say?

Professor MOORE. Anniston on the east; yes.

The CHAIRMAN. Is that of much use in forecasting the weather for Birmingham?

Professor MOORE. It is of use to Birmingham, and it is of use to the Washington office in predicting for the region northeast of there, especially for Virginia and North Carolina.

The CHAIRMAN. They have given you the land for your station at Anniston, have they not?

Professor MOORE. We have not any building there.

The CHAIRMAN. You have not any building?

Professor MOORE. No. I think we could make them give us the land, if we should hold them up for it, if we ever go in there.

Now, Cleveland, Ohio—the polytechnic institute is located there. They have offered us the land, and we are spending there \$1,800 or more rent—I think \$2,000 rent; \$1,800 or \$2,000. I will put it in this way: Our rent at Cleveland equals 4 per cent on \$36,000.

The CHAIRMAN. At what point is that—Cleveland?

Professor MOORE. Cleveland. Now, Cleveland is one of the large cities where we could get close enough to the business part of the city by utilizing this ground and erecting one of these buildings, and we will save in that way the interest on \$36,000. That will require an expenditure of over thirteen or fourteen thousand dollars.

The CHAIRMAN. Would you have to pay a very high price for real estate up there?

Professor MOORE. The ground has already been given to us.

The CHAIRMAN. It has been given to you?

Professor MOORE. It is one of the few big cities, I say, where we can get in.

The CHAIRMAN. Who has given it to you? Has the city given it to you?

Professor MOORE. No; the Case Scientific School, on their campus.

Mr. ANDREWS. What did you suggest that the cost to the Government would be there?

Professor MOORE. I say that there we will spend more, and in a smaller city we can spend less than \$12,000. You are giving us \$12,000 here in these estimates for each building. There we would spend more. I should say we would spend thirteen or fourteen thousand dollars in Cleveland.

Mr. ANDREWS. The rent there, you say, is 4 per cent on \$36,000?

Professor MOORE. Yes. Now, Escanaba, Mich.—I have forgotten whether we have ground offered to us there or not, but we can build there to good advantage.

Richmond, Va.: The college at Richmond is considering the offer of ground to the Government. That is another large city where we can get ground close enough to the business center.

Mr. LAMB. What are you paying there; do you know?

Professor MOORE. We are paying at least \$1,200 there; and I think it is \$1,400. We can build there to very good advantage.

Now, La Crosse, Wis., has 30,000 inhabitants. We can build there to good advantage. We are paying between \$600 and \$700 rent there.

Macon, Ga., Mercer University has offered us ground. That is a city of about 30,000 inhabitants.

The CHAIRMAN. Have you a station there now?

Professor MOORE. Yes; we have had for some time.

Cheyenne, Wyo. There it is very difficult to get proper quarters.

In Baltimore, Johns Hopkins University offers us ground.

The CHAIRMAN. You probably could get quarters at Cheyenne on the Government reservation at Fort Russell.

Professor MOORE. How close is that to the city? Is it out there—

The CHAIRMAN. It is a mile and a half or 2 miles away.

Professor MOORE. Yes; but they would give us the ground there.

Oakland, Mich. Now, there we have an extremely bad exposure for our instruments. There are bluffs coming up and dropping right down, sharply, about 300 feet or so, or more—perhaps 400. The town is right in this ravine, and our exposure of instruments there, especially for our wind record, is very poor. The result is not good. The marine interests complained about it, and their complaint is well founded. We ought to go to the bluffs and build a little observatory up there. One of the cheaper buildings would do up there.

There are two or three other stations. Anniston and Iola would very properly take some rebuilding for their stations. So you see that there are more places that could properly receive buildings than we could construct. Here are about ten that we ought to handle this year, or that we could handle.

I think you gentlemen understand the building question just as well as I do, and I do not think there is any further information that I can give you.

The CHAIRMAN. No; we understand it. As I have said before, a building is a first-rate investment if you take salaries and all that into consideration; and it can be done gradually. You can not do it all in three or four years; but you can take eight or ten or fifteen years to do it, and do it well and economically.

Professor MOORE. Now, Mr. Chairman, you will find the explanation of that right here [referring to report]. I do not believe any of you gentlemen read my annual report; I try to get you to read it.

The CHAIRMAN. Now, Professor, tell us something about the general work of your Bureau. What have you done outside? Have you discovered anything new in your researches?

Professor MOORE. There is just one thing I would like to refer to here first, if you will let me.

The CHAIRMAN. Certainly.

Professor MOORE. It is this—

The CHAIRMAN. We want something interesting now, from a scientific point of view.

Professor MOORE. All right; I will get through with this part of it very quickly. I just want to call your attention to this:

We have at present to submit itemized accounts for traveling expenses, for which not to exceed \$5 per day is allowed. Here is the itemized traveling expense of one of our inspectors for a three weeks' trip. The subvouchers that accompanied this list are in the Treasury now; they are stacked that thick [indicating]. From a pretty careful computation, it has cost not less than \$25 of time for my office and for the Treasury to settle that account of three weeks' traveling expense. It is an account for \$341. The man is allowed, as I say, \$5 per day—not to exceed \$5 per day.

There is one difficulty about the \$5 per day allowance. I go to New York and I spend \$5 a day for my room. My meals will cost me another \$5. I never get out of New York with less than \$10 a day, but I can only charge \$5. Then, again, if I go to some small city in the interior I can get good accommodations for \$2.50 or \$3 a day. I can only charge the Government the \$2.50 or the \$3 a day. What I will save in the one city can not be made up in the other.

Now, I believe, in fact, that you could save a large amount in the settlement of accounts, as well as save in the traveling expense itself, by making the man a per diem allowance when he is traveling under orders. Allow him less than you are giving him now and he will be satisfied, and he would rather have it, for the reason, as I say, that the amount he can save at the one place will make up for the other place.

The CHAIRMAN. Professor Moore, that is a general statute, is it not?

Professor MOORE. No; it is different in all the Departments. Every appropriation bill arranges that matter to suit itself.

The CHAIRMAN. I thought that was a general statute.

Professor MOORE. No. Now, I want to suggest this—I simply suggest it:

Hereafter, when officials or other employees of the Weather Bureau are traveling under orders they may, in lieu of subsistence and expenses for lodging, in the discretion of the Secretary of Agriculture, receive a per diem allowance in addition to their regular salaries not exceeding the amounts named below:

\$3 per day to employees receiving \$1,000 per annum and less.

\$4 per day to employees receiving more than \$1,000 and not exceeding \$1,500 per annum.

\$5 per day to officers or employees receiving more than \$1,500 and not exceeding \$2,500 per annum.

\$6 per day to officers or employees receiving more than \$2,500 per annum.

Take, for instance, an assistant observer, who does not have to meet the president of the board of trade or the mayor of a city, or transact important business on behalf of the Government—he does not have to spend as much money or live at as good a hotel as a higher official.

Mr. BOWIE. And he does not do it, in fact?

Professor MOORE. If you will allow him \$3 a day, he can get along very well with that; but if you allow him the \$5 a day he is going to take it, in fact. He is going to spend up to the limit; don't you see?

Now, I say an official of that rank should not be allowed as much as an official of a higher rank; and I am determining the rank by the salary. I say here, "\$3 per day to employees receiving \$1,000 per annum and less; \$4 per day to employees receiving more than \$1,000 and not exceeding \$1,500 per annum." I will get nearly all the em-

ployees inside the three and four dollar allowances, don't you see? If you will look at my list, which you have there, you will find most of them inside of the \$1,500 limit.

Now, "\$5 per day to officers and employees receiving more than \$1,500 and not exceeding \$2,500 per annum"—that will not be more than 25 people, or perhaps 30, out of 1,600 people. "Six dollars per day to officers and employees receiving more than \$2,500 per annum"—that would include the assistant chief, myself, and 9 professors.

Now, you would save money on that basis, for most of these people would only get three or four dollars per day against five. The Government would save, and they would all be better satisfied. Each man would be saved the trouble of putting down each fifteen or twenty cents that he spends and getting vouchers when he leaves his hotel; and the central office would be saved the auditing of that account with all of those subvouchers, verifying them, going over them; the Treasury would be saved going over that immense lot of business; and if all the Departments would simply decide to pay a per diem allowance to a man traveling under orders, and make the law specific, so that he can only get it when he is really traveling and really under orders and away from his home station, you could, in my opinion, cut out several thousand dollars in clerk hire for the settlement of accounts here in Washington.

The CHAIRMAN. That is, in all the Departments? You do not apply that saving to this Department alone, do you—several thousand dollars?

Professor MOORE. Oh, no.

The CHAIRMAN. You mean in the whole Government service?

Professor MOORE. Yes—more than that, I guess. And our people will get very much less pay by that.

Mr. LEVER. How many of your 1,600 employees, Professor, incur traveling expenses?

Professor MOORE. Six hundred or seven hundred; not over that number.

Mr. LEVER. Six or seven hundred?

Professor MOORE. Yes; and of those at least 600 will come under the three and four dollar rate, and many of them will come under the three-dollar rate, where now we are paying five. Now, the six dollars a day will not let me out on my traveling expenses—it never will when I go to New York, Chicago, or Philadelphia.

Mr. COCKS. Or Boston, either one?

Professor MOORE. Or Boston—yes.

Mr. COCKS. At Young's Hotel.

Professor MOORE. I just brought that account here as an illustration. I wish I had the subvouchers. They are stacked that thick [indicating]. They have all gone down to the Treasury, and I suppose some clerks down there are still going over them; and an estimate that I made on the basis of the pay of the clerks working on these things showed that it cost at least \$25 to settle that account.

The CHAIRMAN. Under this proposed system you would simply certify the number of days?

Professor MOORE. Under this system we will say that I order a man from New York to Chicago. The moment he leaves he telegraphs his departure, and the moment he arrives he telegraphs his

arrival. He is compelled to do that; and then the records of one station show when he left and the records of the other station show when he arrived. Those records go to the Account Division, so that they can not "beat" it.

Mr. HASKINS. Professor, how can any man who is traveling live on \$3 a day, no matter what his salary is?

Professor MOORE. Now, wait, Colonel. He gets his railroad fare in addition.

Mr. HASKINS. Oh, yes—excuse me.

Professor MOORE. This is for his lodging, board, etc.

Mr. HASKINS. Simply board and lodging?

Professor MOORE. And probably many of them will save something on this; but when you allow them \$5 a day, they are going to spend it, as a rule.

Mr. BOWIE. Is not that the rule in the Army? They have a commutation such as this under circumstances of this sort; do they not?

Professor MOORE. They get so much per mile.

Mr. BOWIE. Then they get a commutation of quarters, and such things as that?

Professor MOORE. Yes; yes.

Mr. BOWIE. It is the same principle that you are seeking to apply here?

Professor MOORE. Yes; precisely. Now, I will say this, if you will look into it you will find that its only effects will be to save money and to reduce the expense for labor in the settling of accounts, and it will allow about a dozen people a dollar a day more on their expenses.

Mr. BOWIE. That ought to be a subject for the Keep investigation, ought it not—the matter generally, through all the Departments?

Professor MOORE. I think so. I saw a check in settlement of an account the other day that had fourteen initials on it, beside the signature of the check itself.

Mr. COCKS. It passed through fourteen hands in looking it up?

Professor MOORE. Yes.

Mr. HAUGEN. Professor, as a general thing, do the employees bill the Government for the \$5? Have you made an estimate of the average cost under the present system?

Professor MOORE. Yes; there is a law as to that that limits the allowance to \$5 in most cases. Most departments allow \$5. For the last several years, in giving my own instructions to these assistant observers, young fellows, I have limited them to \$3 for traveling expense, and I have allowed the professors and the inspectors and the men in charge of stations to take the full limit, provided they actually spent it. In some parts of the country they do not spend it, but in the larger cities they will more than spend it.

Mr. FIELD. They are required to file an account, a voucher, to support each item?

Professor MOORE. Yes; a board and lodging voucher.

Mr. LEVER. But there are bureaus in this very same Department that pay from \$6 to \$7 a day for traveling expenses, are there not, Professor; or do you not happen to know?

Professor MOORE. No; not in the Agricultural Department, I know.

Mr. BOWIE. Do you mean to say that you do not know, or that they do not do it?

Professor MOORE. I know they do not do it. I say I know it is not done, because I know there are specific regulations that prevent it.

Mr. LEVER. I think you are mistaken in that, Professor.

Professor MOORE. Here is one change I would like to make. I would like to cut out this assistant chief of the climate and crop division that you specify there, and provide for one additional clerk at \$1,800. It is a change of name, not of salary.

The CHAIRMAN. Whereabouts, Professor?

Professor MOORE. Away over at the beginning of page 3, just below the middle of the page—"one chief of division of supplies." I would like to cut that out, and then increase the number of \$1,800 clerks by one. It is a change of name and not of compensation.

The CHAIRMAN. One chief of division of supplies?

Professor MOORE. Yes.

The CHAIRMAN. What do you want to do with that?

Professor MOORE. I want to cut that out and increase the number of \$1,800 clerks by one. It does not change the salary; it changes the designation. Make that "Six clerks of class 4," if you will. I can utilize that force by having an \$1,800 clerk better than by having a chief of division.

The CHAIRMAN. Where is that—"six clerks at \$1,800?"

Professor MOORE. Instead of five.

The CHAIRMAN. Yes; that would be \$10,800 altogether?

Professor MOORE. Yes. You see, if that man has the rank of chief of division I will have to put him in charge and use him as a chief of division. If he is an \$1,800 clerk I can put him under some other man with better grace, and he will take it with better grace; and I want to utilize him in that way. I can still appoint him in charge of the division at \$1,800 if I want to; but so long as he ranks there as chief of division and is not assigned as chief of division he is not having an assignment in proportion with what the law intends for him, you see.

Mr. LEVER. It will make his services more efficient and make him more valuable?

Professor MOORE. Yes.

Mr. BOWIE. You can boss him better?

Professor MOORE. Yes. Now, Mr. Chairman, I wish some of you gentlemen would go over to Mount Weather with me.

The CHAIRMAN. Tell us about Mount Weather. There has been a good deal in the papers about that, and the committee would like to know about it. Tell us the beginning of the establishment there, when you first commenced building it, and the cost of it, so far.

Professor MOORE. We began that work three years ago. At that time I had purchased a little ground over on the mountain for less than \$2,500—nearly ninety acres. I had erected one little weather-reporting station in the beginning—a station that would be useful merely as an observation station in connection with the forecasts here on the Atlantic coast. We had very few stations along the ridge of these mountains, and I wanted to get two or three. We put in one at Elkins, one at this place at Mount Weather, and one down at Wytheville, Va., to cover these Blue Ridge Mountains.

In establishing that third station I said, "I can get enough ground here for a song, and while I am putting in the station I may as well buy it up," so that I got the other ninety acres for a total cost of less

than \$2,500. A good deal of it cost less than that, but I had to buy up a right of way; a road went through it that I wanted to close, and I had to pay four or five hundred dollars for that; but the whole thing did not exceed \$2,500. Now, I said, "I will buy that because it will be useful to the Government at sometime for establishing a research institution, and if it is not utilized for that it will be useful as a mere weather station."

I wrote in my annual report in that year, three years ago, quite fully what I wanted to do there, but what I had not yet done, and I explained it to you then; and the committee seemed to be favorably disposed to my going ahead and establishing there a research institution, on the idea that if we spend nearly a million and a half dollars in the application of a science that is not yet perfect we might with wise economy spend a little money at one of these 200 stations for the purpose of adding to that very knowledge which we are applying at all the rest.

As I explained to you then we have reached the highest degree of accuracy in our frost warnings, our cold-wave warnings, our marine warnings, and our predictions of the weather generally that it is possible for us to reach with our present knowledge of the science.

Back of every art is the science itself, and your ability to handle that art is going to be proportionate to your knowledge of the science back of it. As a result of that, the committee—I think you, Mr. Chairman—asked how much money I wanted to go ahead with that work the following year in building additional buildings, and I said we did not want any additional appropriation; we wanted an authority. I said that if you left the authority open, as it is now, and as it was then, we could build a little each year.

Mr. LAMB. I recollect that.

Professor MOORE. Yes; and in that way we would gradually lead up to this institution. So that the committee was well informed before we began as to what our general intention was, and the committee seemed to be favorable to it.

Since then we have built one or two buildings here. Usually one of these five buildings has gone at Mount Weather, until we have the main administration building; the power plant and shops; a little cottage under the hill, altered over from a little farmhouse that was there, so as to provide living quarters for two of the workmen and their families; the wagon house and stable, and two magnetic buildings—and they are the best that have yet been constructed anywhere in the world, and the apparatus is of the highest degree of precision. There is nothing anywhere in the world for measuring the different components of magnetic force that is equal to the precision of these instruments. We have been about three years in building those instruments, and they have cost us in the neighborhood of \$10,000. About one-third of them are now mounted.

Then we have a little building which we call a kite shelter. It is a little building about 20 feet in diameter, or perhaps 22 feet, running on a track. It rotates, so that one side of it is open and the other side is inclosed, or one side may be open and the other side is closed. That rotates, and may be turned with a crank, so as to keep the closed side always to the windward. From the open side we can fly kites or we can liberate balloons.

There are now seven buildings constructed at that place, some of them costing only \$350 or \$400, like the stable; some of them costing as high as \$18,000 or \$20,000, like the main building.

The CHAIRMAN. Which is that—the main residential building?

Professor MOORE. Yes.

The CHAIRMAN. How much did that cost, professor?

Professor MOORE. That cost us about \$18,000; perhaps only \$15,000. No; hold on. I have not those figures here. I am carrying a good many figures in my mind, and I want to be clearly right.

The CHAIRMAN. Well, approximately?

Professor MOORE. Our first contract on that building was only \$9,000. Of course the contractor went to pieces on it, and we had to help him out in one way or another, and we finally got it up. Then we completed it by day's work; that is, we added to it; we cemented the outside by day's work. So it stands us not less than \$15,000; and it is a fine structure, too.

The CHAIRMAN. Is it of stone?

Professor MOORE. All stone. We got the stone for all of our buildings right on the premises, and we had a surplus then; and we built a stone fence around all the exposed side of the premises, a distance of a mile or over—maybe a mile and a quarter.

The CHAIRMAN. Is it loose stone, or laid in cement?

Professor MOORE. Loose stone. We cemented the top; we put the cement cap on the top part of it. It is not yet all done.

We have spent, so far, \$61,000 in those buildings. We have spent a little over \$20,000 in instruments and machinery and appliances. In the power house, for instance, I have a 35-horsepower gasoline engine. I have an electrolyzer for charging water under high potential and changing it into hydrogen gas; that cost \$2,500. I have lathes and tools for the making of things; I have one skilled mechanic and an engineer. I have the place equipped with electric wires, so that I can light it all from the power plant. I have also a gas plant, so that when we may not want to run the engine (as is sometimes the case) we can run the acetylene plant. Then we drove a well 108 feet deep right in the crest of that mountain, and got all the water we could use—splendid water.

The CHAIRMAN. Only 108 feet deep?

Professor MOORE. Only 108 feet deep, right in the crest of the mountain, where it would appear that there was no watershed at all; and still we got all the water we could use. We pump it up by means of a little oil engine into a pretty large tank. I can not give you the capacity of it now, but it is a large tank and supplies the water for the whole place.

The CHAIRMAN. That is all included in the cost so far?

Professor MOORE. Yes; I have spent about \$100,000 there. The running expense, the salary expense, of that institution to-day is \$13,000 a year.

The CHAIRMAN. Before you get to that, the total expenditure up there up to date is about what, in round figures?

Professor MOORE. It is somewhere between \$100,000 and \$125,000. I can not give it to you exactly.

Now, Mr. Chairman, we have furnished the main observatory building and the administration building for office purposes, and we

have furnished them for the living purposes of the people, just as you would at a military post or a mountain astronomical observatory. We must give the people that live there proper domestic facilities; and a good many of our people are transient. Those that are transient, and the supervising official, we quarter in the main building. We furnished that building. We furnished their sleeping rooms and their living rooms. We furnished them substantially and well, but not extravagantly, as you may have read in the newspapers.

The CHAIRMAN. You furnished the linen and glass and everything?

Professor MOORE. Yes; everything is furnished there, and in the kitchen and dining room; but the mess is supported entirely by the people that live there, and the attendants are paid by them. They pay a dollar a day into a mess fund, and pay for their own cook, their own waiter, all their own service, and all their own provisions. Now, you probably have seen some account in a newspaper——

The CHAIRMAN. Right there, I wish you would send to the committee an itemized account of the cost of these several buildings——your stone fence, etc. We may have to answer some questions about those things on the floor.

Professor MOORE. I will do so; but that will take me four or five or six or seven days.

The CHAIRMAN. There is no hurry about it; I just want to have it for use if necessary.

Professor MOORE. I can see about \$100,000 there now, and it may run a little over that, but not very much, I think; and when we get through it will probably cost——

The CHAIRMAN. That is what I want to know——what it will cost when completed.

Professor MOORE. We are now finishing the physical laboratory. We have that up to the second floor. We can not finish it, of course, at present; we are not working on it just now.

When we get through and start to get the apparatus in there, we will probably be spending money there for five years yet to come, and I presume that if we carry the complete scheme out the whole plant will probably cost us not less than \$200,000. It will not go over that; it will not be above that, but that will give to this Government the most perfect set of apparatus that human ingenuity can devise for experimenting in these problems of aero-physics.

There have been many wonderful discoveries made by physicists and chemists within recent times that have a truly wonderful effect on the air. The chemist and the physicist knows nothing of meteorology; he does not care anything about it; neither does the astronomer, who is now measuring the sun by his photo-heliographic processes. But these discoveries all have a very important relation to meteorology, the physics of the air; just what relation we do not know. We are establishing at this place an institution that will enable us in the next ten years to determine whether it is possible for science to make a prediction of the rain and the sunshine on the cotton belt or of the droughts over the corn belt.

Mr. BOWIE. For how many months in advance?

Professor MOORE. For a season in advance. Of course, it is not necessary for me to say what a wonderful conservation of human energy would result if we could only tell what would be the rainfall and the temperature over these great cereal States or great cotton

States. We do not know but what it can be done. We do not know that it can be done, but we do know this:

To-day we are making forecasts that, according to a recent computation made during the past year, show 88 per cent of accuracy. That is our average accuracy over the whole United States. In the past ten years, since 1893, we have gained 5 per cent. That has been a very great gain, and it has only been gained by the most rigid application of the doctrine of the "survival of the fittest." We keep every forecaster working in direct competition with other forecasters; every statement he makes for publication is compared with those of all the others. It is compared with a certain standard, and his departure from that standard is entered up.

There is brought to me the record of every local forecaster and every district forecaster, and at the end of the year I have a combined statement of those records; and once every year I go through that statement, and once every year man after man who can not keep pace in that intellectual competition drops down, drops aside, and the brighter, more intellectual man comes to the front. It has been severe on our people, but it has raised the degree of accuracy up to 88 per cent. I was thinking the other day that perhaps it is too fierce; for I have had more people go to the insane asylum, I am sorry to say, than from any other bureau of the Government service. That fierce intellectual competition does wreck the weaker minds; but it gives the public service the stronger ones. The whole thing is illustrated by a lecture that Doctor White gave here, showing the lines of radiation, showing the geographic distribution of insanity.

The CHAIRMAN. You say that when you have completed that establishment up there it will cost not to exceed \$200,000?

Professor MOORE. Yes; and its running expense—

The CHAIRMAN. Now give me the cost of its maintenance.

Professor MOORE. Yes; its maintenance now is \$13,000 a year for salaries.

The CHAIRMAN. For salaries?

Professor MOORE. Yes.

The CHAIRMAN. How many people have you up there?

Professor MOORE. I will show you. Professor Humphreys receives \$3,000; that is the highest salary. He is one of the best developed mathematical physicists we could find in the country.

The CHAIRMAN. Does he make his headquarters there constantly?

Professor MOORE. All the time.

The CHAIRMAN. Winter and summer?

Professor MOORE. He is the supervising man.

The CHAIRMAN. Is his family there with him?

Professor MOORE. He has no family. He is a man about 35 years old, one of Roland's brightest pupils—Roland, the great physicist of Johns Hopkins University. For some time he was professor of physics at the University of Virginia. I went all over the country looking for bright, active physicists, men who had fine technical training, and who still had their futures in front of them, not behind them, as the Irishman said; and I finally located this man Humphreys by the work that he had done.

Mr. LAMB. Was he at the university then?

Professor MOORE. We found him at the University of Virginia then, and we negotiated with him to come. We made overtures to

him. He did not come to us at all. He was not an applicant for the place. He is a very talented man, a native of West Virginia; and so I took him for the supervising director. I did not take one of our own experts. You may think that strange. Why? Because I wanted a man peculiarly talented in the use of the latest laboratory apparatus that applies to these particular problems; and he seemed to be a man who had made a specialty of it since he left Roland. He was with Roland when he made his defraction gratings by which an inch is divided into 40,000 equal spaces.

Then there is Mr. Louis G. Schultz, our director of magnetic and electric research. He gets \$2,000 and quarters—a good salary, but he has been about fifteen years in our service. We have lent him twice. We lent him to the Geological Survey at one time, and he was for two years with the Argentine Republic, establishing meteorological stations there; and he superintended to a large extent the making of these instruments. I think he is probably the ablest man in the United States, if not in the world, for the purely observational work in magnetic phenomena.

Doctor Fassig I have selected as the special student of upper-air problems. He gets \$2,000 and quarters, heat and light. These are good salaries; but these are the most talented men of our service, bear in mind, that I am referring to now. Doctor Fassig came from Johns Hopkins University, also.

The CHAIRMAN. They got fuel, light, and lodging?

Professor MOORE. Yes.

The CHAIRMAN. But not board?

Professor MOORE. No; not board. Right there let me state that there has never been a Government carriage on those premises. I have seen accounts in the papers of "high-spirited horses" and "liveried coachmen," and Government carriages, and I have read time and again about entertaining parties over at Mount Weather. I suppose that is too ridiculous to answer; but I will say for the information of the committee that there have never been but four people not workers in that institution who ever spent a night in it. One of them was Mr. Bell, the inventor of the telephone, whom I took over there because I wanted to consult him. Another was the managing editor of the Philadelphia Press, who was quite a meteorologist. But I should not hesitate to take anybody over there that I wanted to take over there and keep him over night if I felt like it, and show him the place. I go there when I can myself, though I do not go there as much as I ought.

The chief mechanic there gets \$100 a month. He is a fine mechanic, a worker in metals and fine instruments. Then the man who runs the weather station there and has charge of the buildings and the grounds—

The CHAIRMAN. The superintendent, as it were?

Professor MOORE. The superintendent of the grounds and buildings.

The CHAIRMAN. Not a scientist?

Professor MOORE. Not a scientist. He gets \$1,000 and quarters.

The CHAIRMAN. Do those quarters include fuel?

Professor MOORE. Yes. Now, then, the assistant to the magnetician gets \$1,000—the assistant to this \$2,000 man. Then I have Bowles, Sherry, Baxter, and Kelly. I have Bowles and Sherry, two

laborers, at \$720 per annum, and I have Baxter and Kelly, two laborers, at \$480 per annum; and I have one at \$360.

The CHAIRMAN. And all those men get lodging, light, and fuel?

Professor MOORE. Every one of them—oh, no; two of the \$480 laborers live on the mountains right adjoining there. They are mountaineers that we have hired there, that had been there for a long time, ever since we have been there.

That is the permanent force that is there; that is the scientific force, and the few laborers that are necessary to do the work about the premises—care for the furnaces, take care of the horses, etc. We keep two teams. We have two democrat wagons that run to the station, backward and forward. There is a trip made to the station, not every day, but sometimes twice a day; it depends upon the emergency.

Mr. LAMB. What sort of wagons?

Professor MOORE. Why, I have one wagon with two seats, a heavy democrat wagon with a big break on it, and I have one longer one with three seats that I can carry trunks in.

There is our expenditure of \$13,000 for salaries; and the other expenses will probably carry the regular maintenance of that station to probably in the neighborhood of \$20,000—not over that.

The CHAIRMAN. You keep four horses there?

Professor MOORE. Oh, yes. I hire, every summer, three or four teams besides.

The CHAIRMAN. That is, during the time they are actually required to do the work?

Professor MOORE. Yes.

The CHAIRMAN. When they are engaged in doing work by the day?

Professor MOORE. Yes.

The CHAIRMAN. Did you build this wall by day labor or by contract?

Professor MOORE. We built that by day labor, and we have built roads by the day, hiring our own people. We have built all the buildings, except the first one, by the day. I saw some statements in the paper to the effect that I was paying \$3 a day to ordinary, common laborers. I never paid but a dollar and a half a day. Of course that was more than they were getting before, but I believe it was a fair rate. We paid \$1.50 a day for our common labor, and \$2.50 for our carpenters.

The CHAIRMAN. For eight hours' work a day?

Professor MOORE. Eight hours a day; \$2.50 for our carpenters and \$3 for our stone masons; and all except the first building we have built by day's labor in that way.

The CHAIRMAN. Do you not think that would be better done by contract?

Professor MOORE. No.

The CHAIRMAN. Why not?

Professor MOORE. We tried the contract plan one year, and we were about two years fooling around, and we could not get much done.

The CHAIRMAN. Of course that may have been your experience in that case, but—

Professor MOORE. Nobody here will bid on it. If I get a contractor here in Washington to go up there, he will charge us twice

what we could build it for ourselves by day's labor; and there is only one man——

The CHAIRMAN. I will guarantee that even then he will do the work a good deal cheaper for you than you could do it by day's labor.

Professor MOORE. You can not get him to go up there. You can not get a contractor to go up there and bid on the job.

Mr. BOWIE. On account of the distance?

Professor MOORE. The distance and——

The CHAIRMAN. Oh, well, you can get a contractor to bid on anything in this world.

Professor MOORE. Oh, no; you can not—not now. The people are too busy. You can not get a contractor to go up there and bid on that work without charging us from fifty to a hundred per cent more than it will cost us to do it.

The CHAIRMAN. And then he will beat your cost.

Professor MOORE. Oh, no.

The CHAIRMAN. Yes; he will. If you pay \$1.50 a day for eight hours' work a day he can beat you.

Professor MOORE. We tried it and tried it, and tried our best; and the only bid that we could get was from a man that lived over there, down in the valley—a good man, a splendid fellow, and an honest man. He did the work honestly and faithfully; but he lost money. He came out in the hole, and he could not do the work in time. He wanted to fix the time himself.

Now, I could go over there, as I did—I spent two months there myself—and I could take a force of men, hire a boss mason and a boss carpenter and a few skilled artisans, and then fill in with this \$1.50 labor, and go right out there and take charge myself; and I could put up a building and have it up and finished in three or four months or less.

The CHAIRMAN. But you can not be there all of the time.

Professor MOORE. No; but we have our building men there in the summer.

Now, just let me say this, Mr. Chairman: I should say that at the culmination of our work there, when this institution is done, our running expenses are going to be \$25,000 annually. After about five years they will slowly work up, I should say, to \$25,000. That will be the extreme limit that can be spent, and you will have an institution such as will more than compare favorably with anything else in the world, because there is nothing else in the world as complete as this institution will be for this line of research.

The CHAIRMAN. Well, most of us hope to be here five years from now, and we will remember this promise of yours.

Professor MOORE. I have never broken faith with you yet, gentlemen; I never have.

The CHAIRMAN. You say that \$200,000 will complete it, and \$25,000 a year will run it?

Professor MOORE. Yes, sir; yes, sir.

I have not anything more, Mr. Chairman, unless you have. I would like to get you gentlemen to read this report.

The CHAIRMAN. Well, we will. Now, Professor, what have you done in kiteflying? Did you succeed in getting your kites up as you hoped to, and in getting the desired observations up there?

Professor MOORE. We have just gotten ready for that. Now, we do not expect to do much kiteflying. We shall send up a few kites from that mountain and carry them to great altitudes, and leave them there for days, as long as we can keep them up, and get all the information we can about the constancy or lack of constancy of the thermal conditions at high altitudes. But the line of research that we are especially interested in is to liberate a great many free balloons, little balloons about three feet in diameter, adjusted so that they will explode at about five and ten miles' elevation, respectively, taking these two levels for exploration. What I purpose to do then is to equip my western stations with a number of these little balloons, collapsed balloons; and each station will have a cylinder of hydrogen gas, which we will make over here and send to the various stations.

Each one will have a number of these collapsed balloons, and it will have some of these little aluminum cases containing the automatic instruments that will register pressure, temperature, and humidity. We designed those instruments ourselves. Now, then, when I get a rain storm or a cold wave, either one, overlying the Rocky Mountain plateau, and I want to explore it, I will telegraph to, say, three stations in each quarter of that storm, "Liberate your balloons at a certain hour and day." When they are liberated they go up, they shoot right up through that storm; and as they go up they register the pressure, the temperature, and the humidity. They reach their given altitude; they explode; the instruments settle under a little parachute, and they land somewhere. The majority of them I will get back, because there will be a reward printed on them, you see; and when I get them back the case will come back to Mount Weather, and there it will be opened; and then Mr. Fassig (who is the student there of that problem) will take that weather map that occurred two or three weeks ago, the map of the storm he was exploring, and will begin charting, in the four quarters of that storm, the vertical gradient, the temperature, the pressure, and the humidity—in other words, the degrees of temperature and pressure in the several different quarters of that storm.

We know that a mass of air that is homogeneously heated will remain at rest forever, perfectly quiescent, unless it is acted upon by some extraneous source, like being pushed aside by some other mass of air, being acted upon by the rotation of the earth, and so on. If it is homogeneously heated, evenly heated, and its density is all exactly the same, it will remain at rest indefinitely. Therefore you can get no movement in a storm, no energy, no internal energy in a storm that is not due to difference in temperature between one part of that air mass and the other, or between the temperature of one mass and the temperature of some other mass that is coming toward it. So your source of energy is mainly due to the difference in temperature between the air at the bottom of the storm and that at the top of it, or some air up in the interior. If we get these readings, running up through these storms and cold waves, we are going to get at all the mechanical action that is involved in the movement of the storm; and that is the only way we can get it.

When we get that you may say, "Here, you can send out these balloons and explore the storm, but the storm will be gone weeks before you get your instruments back, so you can not forecast the storm

by that means." That is true; but we are after information now as to what goes on in that storm.

That is one special line of research which we are pursuing now.

A MEMBER. Let me ask you, there, whether that instrument will not be broken all to pieces in coming down?

Professor MOORE. No; it comes down under a parachute. Now, take another line of research: We are building now, after Professor Langley's model (and I have had a man for the last six months working down with him), a bolometer of very close precision that will measure the temperature to the one hundred-thousandths—that will measure accurately one one-hundred thousandth of a degree Centigrade by differential action of electricity on two little pieces of platinum.

The last two or three years' observations with the instruments now constructed—and we shall make one of much higher degree of accuracy—have shown a remarkable thing, that contravenes pretty nearly everything we have known in regard to solar radiation. They show what is apparently a marked decrease in solar output. We have assumed that the sun was all the time radiating a constant energy into space. The results recorded by this instrument for two years show a marked deficiency, and it is a singular thing that we have had, up to the present time, three cool summers in succession, and both the last winters were cold. I do not know what that instrument will show within the next two or three months; but it is a singular coincidence that these bolometric measurements show a decrease in the solar intensity.

We want to carry those years of observation out minutely, and it may be that we will be able, through the measurements of the action of the sun itself, to foresee the marked sweeps of these cold waves, and possibly seasonal changes; we do not know.

Mr. SCOTT. Do your observations show how contemporaneous these conditions on the sun are with the change of conditions on the earth?

Professor MOORE. That is precisely what we want to do. For instance, in our solar physics observatory we shall measure the activity of the surface of the sun. We will take the heliograph, for instance, by which we can bring the sun one hundred thousand times closer than you can with the strongest telescope; we will note the number of these hydrogen flames that shoot up four or five hundred thousand miles from the surface of the sun, called prominences—that is what the astronomers call them. We will count the sun spots and the bright faculæ that surround them, the number of them, and their frequency. We will count them up and chart them. "That has been done," you will say, "heretofore." So it has; but we are going to keep a concise record of them there also. But, mainly, we are concerned in measuring the variation in the different rays of light which the sun is sending out, and tracing them and correlating that with the contemporaneous weather.

There is a point where there has been little or no effort to take all of these wonderful observations of the astronomer, the chemist, and the physicist, and have them contrasted with the contemporaneous weather. That is precisely what we want to do. That is precisely what we are sending these experts there now to do. And if we see a variation in the solar output we can step right across the grounds to

the magnetic observatory, and we can see what these instruments are showing; we can correlate the magnetic variation with these variations in the different wave lengths that constitute heat.

There are so many important problems there to investigate that have never been touched, and this science of ours is so imperfect, and you get so much benefit every year out of the applying of it in its imperfect state, that I think you agreed with us a long time ago that we ought to have one institution that would develop the science of the problem.

Mr. HENRY. What are you doing with the kite investigations that you are making? You made some experiments at Fort Myer some years ago, I remember.

Professor MOORE. Well, Mr. Henry, there we got negative information. I thought that we could develop a kite that we could fly under any conditions with the most gentle wind, and that by establishing a number of stations just like our other stations we could get enough kites up to a mile elevation on any day to construct a chart from that elevation, and then to plat and draw off the horizontal distribution of temperature and pressure on that elevation. We established 16 kite stations in an area a thousand miles square; but we found that out of the 16 stations we never could get an average of more than three or four kites on any given day that would reach the mile elevation, and we could not get enough to enable us to construct a weather chart of that elevation, as we wanted to do. It was an effort which we made, and we failed in the primary object.

We did succeed in getting about 1,200 observations that reached more than a mile high. They are useful for theoretical study, and have been published in a little pamphlet which has gone all over the world; and we got information which was useful to us.

The CHAIRMAN. Your hope was, by charting that upper air, to more accurately forecast precipitation?

Professor MOORE. Yes; if you can make a distribution and determine what is the gradient of pressure as it shades off from this region over to that on a level a mile high, say, you already have the same thing down at the earth; and all you need to do is to ascertain and map the difference between the two levels and make vertical gradients. Now, I have not any idea but what we can make better forecasts when that is done; we will know why a storm changes from its normal track and shifts over to another region that we do not anticipate.

Mr. SCOTT. Professor, I want to inquire how much time limit you allow yourself in making up your percentages of accuracy in the matter of forecasts? For instance, if you make a forecast predicting rain to-morrow afternoon, and that rain comes in the morning, do you call that an accurate forecast?

Professor MOORE. We predict in twelve-hour periods, between 8 a. m. and 8 p. m., and between 8 p. m. and 8 a. m. the next morning. The rain has to fall during the twelve-hour period or the prediction is a failure.

We hold ourselves down to a very rigid marking. As I say, if the forecaster predicts rain to-day, it has to fall between 8 a. m. and 8 p. m., or we score him a failure. If he predicts rainfall to-night, it has to fall after 8 p. m. and before 8 a. m. the next morning. He

must predict in twelve-hour periods, and his rain must fall inside of his period; so that we hold him down to a very rigid rule.

Now, if you will notice here, I do not think we have lost a rain or snow here in the last month. I do not think we have. Nobody has ever mentioned it, and we never hear a word of it. But let a rain or snow fall here on a fair-weather prediction, and every man, woman, and child in the city will comment on it. They will begin to talk about it when you are a square off, and if they see any other weather man they will comment on it. It is a tendency of human nature to see your faults and never to detect your virtues.

But I will say this, that rain and snow do fall many times when our meteorological chart gives us no information of it, when there is nothing to be gained from the distribution of pressure and temperature that will enable us to determine whether or not it is going to rain or snow. Many times that does occur; and especially does it occur down along the Tropics, and especially in the southern part of the country, along the Gulf States there. It is very difficult for us to foretell the rainfall there—extremely difficult.

Mr. COCKS. How about in the vicinity of New York, along the coast there?

Professor MOORE. There is always a complication right on the line between land and water, because there is such a difference between the two, and the air takes its temperature so materially from the temperature of the surface over which it passes—

Mr. COCKS. It is much easier to predict in the central west what the weather is going to be than it is in New York or Boston, is it not?

Professor MOORE. Well, I would hardly want to say that. I will say that it is easier to predict for Ohio and Tennessee and Kentucky than it is for the New England coast line.

Mr. COCKS. That is what I mean.

Professor MOORE. Mr. Chairman, here is the order organizing Mount Weather.

INSTRUCTIONS }
No. 98. }

U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU,
Washington, D. C., July 24, 1905.

The following organization of the research staff of the Weather Bureau is hereby authorized.

AT WASHINGTON.

Director.—The Chief.

Board of advisers.—Prof. Cleveland Abbe, Prof. Charles F. Marvin, Prof. Frank H. Bigelow, Chairman, Prof. Edward B. Garriott, Prof. Henry J. Cox, Prof. Alfred J. Henry, Prof. Alexander G. McAdie, Prof. Harry C. Frankenfield, and Prof. William J. Humphreys.

AT MOUNT WEATHER.

Supervising director. Prof. William J. Humphreys, who shall have detail supervision of all work in the physical laboratory and solar-physics observatory and general, rather than detail, supervision of other researches. He will aid the research directors in matters wherein his knowledge may be of assistance, and will be an adviser rather than a director of their research; although in all matters of cooperation between research directors he will have the controlling voice. He will have charge of the discipline of the institution, referring to the chief such matters as can not be settled at the station.

Mr. Herbert H. Kimball, who, through the courtesy of Prof. S. P. Langley, is receiving special training at the Smithsonian Institution in the use of the bolometer, will be Prof. Humphreys's principal aid in solar physics, and Mr. Herbert L.

Solyom, who, by the kindness of Prof. E. B. Frost, is doing special work at the Yerkes Observatory, will be an additional assistant.

Director of magnetic and electric research.—Mr. Louis G. Schultz, who shall have charge of the magnetic observatories and observations in atmospheric electricity and special electric and magnetic research.

Director of upper-air research.—Dr. Oliver L. Fassig, who shall have charge of balloon and kite observations and the discussion thereof. Messrs. Schultz and Fassig will arrange for cooperation in the taking of electrical observations from kites.

Observer in charge of property.—Mr. Charles S. Wood, who, under the general control of the supervising director, shall have charge of the premises, repairs, improvements, heating and lighting, power plants, horses and vehicles, meteorological observations and forms, and the mess and the forage funds. He may correspond direct with the central office in regard to the details of the work with which he is charged.

Each official will discuss his own observations and, so far as possible, correlate the events shown by his reports with those indicated by the observations of others. There will be a cheerful willingness to cooperate for the general good of the institution and the advancement of the science of meteorology.

There will be no publication in the bulletins of the Bureau of mere argument of abstract theories in science. The place for such is in scientific publications, which are open to all. No more data will be published in the announcement of results than are necessary to make clear the subject-matter, except when the data are new.

The prime object of the institution, which is the taking of observations and the gathering of data with which to make experimentation and prosecute research, will be kept in mind. Unpublished data will be open to the use of all recognized investigators, and cooperation with other scientific workers will be encouraged. Questions that may directly or indirectly be of value to the science of meteorology will be proper subjects for investigation. The field of inquiry will therefore be a broad one.

(L. R. 8360 and 8847, 1905.)

WILLIS L. MOORE,
Chief U. S. Weather Bureau.

Approved :

JAMES WILSON,
Secretary of Agriculture.

[Instructions Nos. 89 to 97, inclusive, current series, not for general distribution.]

The CHAIRMAN. How about the West Indian service; are you getting good results from that?

Professor MOORE. No; we ran those West Indian stations for three years, until we got three years of full, complete record, from which we could answer inquiries. Then we closed those stations. We open them in June and close them in December. They remain closed about five months. We do not run them during the season when hurricanes are not dangerous; and we leave the property there in charge of our consuls, lock the stations up, and bring the men back here to work.

The CHAIRMAN. Who are these men that you send down here for this work; where are they taken from?

Professor MOORE. They are all experts, taken from our various stations. We use the young men. We never send a man down there of less than two years' or eighteen months' service.

The CHAIRMAN. When do you send them there; in June?

Professor MOORE. Yes.

The CHAIRMAN. And keep them there until when?

Professor MOORE. Until December; and they are taken out of the station force. They are usually young, unmarried men. When they go they get an allowance of quarters, and they get a dollar a day allowance for subsistence while they serve in the Tropics. That

begins when they reach the station and ceases when they leave the station, and their salaries do not change. Under the old method, we used to change their salaries every time we sent them down there, increasing them when we sent them down there and reducing them when we brought them back. In this way there is a certain allowance that belongs to those West Indian stations that they get.

Mr. SCOTT. Can you depend absolutely on there being no hurricanes in that region between December and June?

Professor MOORE. Yes, absolutely; or practically so. It is perfectly safe in that period.

The CHAIRMAN. You had no hurricane this year, did you, that struck our coast?

Professor MOORE. There was no hurricane that did any damage in the West Indies, but there were several that began in the West Indies and that we were able to track that did not become destructive until they reached our South Atlantic coast. But when they got within the region of Florida, we had three this last season that were very severe on our coast line, extremely so; there was some loss of life and property, and there would have been millions of loss of property if it had not been for the warnings. There has not been a year that those stations have not given us warning of the coming of several storms; but many of those storms do not reach dangerous intensity until they begin to recurve. They always recurve in latitude between 26 and 30, their track being a parabola with a bend in about that latitude.

The CHAIRMAN. Before I leave that subject, tell me about the cost of the West Indian service, in round figures.

Professor MOORE. It will be pretty hard for me to answer that.

The CHAIRMAN. Well, approximately—between what; twenty-five and fifty thousand dollars, or twenty-five and thirty?

Professor MOORE. Well, the telegraphing, I should say, costs about \$50,000. You gave us \$75,000 there in the beginning.

The CHAIRMAN. Yes.

Professor MOORE. Just to equip those stations during the war. I think then you continued it at \$50,000, did you not? That is my recollection.

The CHAIRMAN. Yes. Now the whole thing goes together in one lump sum?

Professor MOORE. Yes. Now, I have saved something by closing those stations five months in the year. By bringing those men back here and putting them at work in our service here I make some saving on that over what it used to cost before, and of course that has gone into the general fund. I have utilized it in one way or another.

The CHAIRMAN. How do the men stand that climate? That is the hot season down there, is it not?

Professor MOORE. Yes. Nearly all of them come back thin. The northern man does not thrive in the Tropics; that is certain.

Expenses incurred at Mount Weather, Virginia, for all purposes, from September 22, 1902 (date of purchase of land), to January 20, 1906.

Buildings and land.....	\$61, 613. 14
Furniture and furnishings.....	5, 841. 04
Telephone and telegraph lines.....	1, 896. 43
Roads, fences, and ground improvements.....	5, 290. 78
Hauling of building material and supplies.....	7, 123. 98

Running expenses, supplies, etc.....	\$5,658.99
Freight and express.....	308.32
Instruments.....	11,525.82
Machinery and tools.....	12,771.19
Horses and wagons (3 horses, \$360; 2 farm wagons, \$119; 2 delivery wagons, \$226; 1 heavy spring wagon, \$191; 2 saddles, \$82; miscellaneous equipment, \$360).....	1,347.00
Miscellaneous labor.....	5,681.93
Total.....	119,056.67

(The committee having gone over the estimates relating to Professor Moore's Bureau, he was excused with the thanks of the committee; and the committee adjourned until Tuesday, January 16, 1906, at 11 o'clock a. m.)

COMMITTEE ON AGRICULTURE,
Tuesday, January 16, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

STATEMENT OF MR. ALONZO D. MELVIN, CHIEF OF THE BUREAU OF ANIMAL INDUSTRY.

The CHAIRMAN. Gentlemen, we have Doctor Melvin, who is the head of the Bureau of Animal Industry, before us this morning. This Bureau commences on page 7 of the Book of Estimates. There are no changes in the salaries in that department which are suggested in the estimates, except that the salary of the Chief of the Bureau is restored to what it was before we increased it for Doctor Salmon.

That increase was made specifically as an additional compensation during the incumbency of Doctor Salmon, and was dropped—lapsed—after his resignation; so that the salary of the Chief of the Bureau is now \$4,500 instead of \$5,000, which Doctor Salmon had. There are no other changes suggested in the salaries, I think, and we come now to the main lump-sum appropriation; that is, the appropriation that carries on the work of the Bureau. That is on page 8 of the Book of Estimates.

The first change in the reading of that item occurs about midway, in italics, and reads, "and also the provisions of the act approved March 3, 1905, to enable the Secretary of Agriculture to establish and maintain quarantine districts, to permit and regulate the movement of cattle and other live stock therefrom, and for other purposes." Doctor Melvin, what is the need of that? Was not that covered? Did the act of March 3, 1905, fail, or must it be reenacted?

Doctor MELVIN. No, sir.

The CHAIRMAN. Did you not have that authority before?

Mr. MELVIN. Yes, sir.

Mr. BOWIE. It is to get the money now, as I understand, is it?

Mr. MELVIN. Yes, sir.

Mr. BOWIE. You want the money applicable to purposes of that act, and you repeat the act here simply to identify the purposes for which the money is to be used, or one of the purposes; is that it?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. My point is that he has had this authority before.

Mr. BOWIE. He has had the authority, but not the money.

The CHAIRMAN. The money is in the main appropriation. He has done this work before. "To establish and maintain quarantine districts." He has done that. And "to permit and regulate the movement of cattle and other live stock, and for other purposes." He has done that.

Mr. HASKINS. You will remember that the act of 1905 is the one that I had charge of, and that is a general law.

The CHAIRMAN. That is a general law. I do not say that that is unnecessary, but I want it explained.

Mr. MELVIN. It is there as showing the application of a part of that appropriation.

The CHAIRMAN. The appropriation through that act?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. On the bottom of page 9 another change is made, "Provided, that not more than one hundred thousand dollars of the sum herein appropriated shall be used for the microscopic inspection and certification of pork for export."

Mr. BOWIE. There is another change, if you will pardon me, Mr. Chairman, on the bottom of page 8—that is, I imagine it is a change; it is in italics. It seems to be a change in the amount of money, "one million six hundred and seventy-nine thousand."

The CHAIRMAN. Yes.

Mr. BOWIE. I do not know whether this is the proper place to consider that.

The CHAIRMAN. We want to take that up when we consider the whole appropriation.

Mr. BOWIE. Very well.

The CHAIRMAN. What is the need of that provision on page 9, "That not more than one hundred thousand dollars of the sum herein appropriated shall be used for the microscopic inspection and certification of pork for export?"

Mr. MELVIN. Heretofore there has been no definite sum set aside for this microscopical inspection, and in consequence it has been rather embarrassing to us, as in some years when trade conditions were not favorable very little of this microscopical inspection was done and that money would be diverted to other channels of work, and possibly the following year conditions would demand an increase in this microscopical inspection, and in consequence the money would not be available, work having been arranged in other directions. So that I think it would be much more satisfactory if we could have a definite sum for that particular work, and in my recommendation to the Secretary I suggested that this money be set aside for that work only; and if it is not used it will revert to the Treasury.

The CHAIRMAN. Would that be sufficient? The Department claims now there is quite a demand for inspection, on account of the proposed change in the German tariff. In case of an emergency like that, would \$100,000 be sufficient?

Mr. MELVIN. Unless it was considerably in excess of what we have had heretofore, it would be sufficient.

The CHAIRMAN. It would be sufficient?

Mr. MELVIN. Yes, sir. Of course, we can not absolutely anticipate that.

The CHAIRMAN. No; but could you not effect the same object by a distribution of your funds yourself, in your office, subject to the approval of the Secretary, and not make it so rigid an apportionment as it would be made by putting it this way in the law?

Mr. MELVIN. Our work would be extended in other lines, and when we came back to the microscopical inspection we would find that other work had taken its place to a very great extent.

The CHAIRMAN. You mean the other work had used up the money? You mean that the money had been expended?

Mr. MELVIN. Yes, sir. Well, it is work that is outlined and can not be very readily done away with.

The CHAIRMAN. Suppose you divide this money up, so much for microscopical inspection and so much for live-stock inspection and so much for post-mortem inspection, and do not make an arbitrary rule, but say that you set so much aside for each of these kinds of work.

Mr. MELVIN. Yes, sir.

The CHAIRMAN. If an emergency should arise in any one of those three classes you could, without breaking the law, draw from one to the other, and that would be what you might call a business distribution of the funds of the Bureau within the Bureau itself.

Mr. MELVIN. This would permit of that.

The CHAIRMAN. Yes; but you could not expend more than \$100,000, if you put it in the law in this way, under any emergency. My idea is to give it some elasticity in the Bureau itself. Make the apportionment of the money by order of the Bureau instead of by law, that is my point. If you put this in the law it would prevent you from spending any more than that, and you might, under an emergency, want to spend more. Suppose that you said \$100,000 for microscopical inspection, \$100,000 for live stock, and \$100,000 for post-mortem inspection, and then tried to hew to that line; but if an emergency arose you could spend more as the emergency demanded. But if you put the apportionment in the law you can not do it no matter what the emergency is.

Mr. HASKINS. This is simply for pork?

The CHAIRMAN. Yes; that is the only microscopical inspection you have, is it not?

Mr. MELVIN. Except the laboratory work here.

The CHAIRMAN. Yes; the laboratory work.

Mr. BOWIE. Have you been in the habit of spending as much as \$100,000 a year for this particular purpose?

Mr. MELVIN. Probably several years ago it may have reached that. I am not prepared to state, but it has not within recent years.

Mr. BOWIE. Do you recall what is the average in recent years, or about the average you have spent for that purpose? I am trying to get at whether you have estimated what the probabilities are.

Mr. MELVIN. The previous year, without any additional increase, we have estimated the cost at \$72,000, and have allowed an increase of \$28,000 to meet any additional demands.

Mr. BOWIE. That is your elasticity, which you think is all that will be needed?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. I notice that you reestimate "For experiments in animal breeding and feeding in cooperation with State agricultural

stations," \$25,000. What does the Department propose to do with that money?

Mr. MELVIN. It is to continue the experiments that have already been undertaken, and to initiate some new experiments, I believe.

The CHAIRMAN. In addition to those you have initiated? What ones have you already initiated?

Mr. MELVIN. The largest is one in Colorado, in horse breeding; and then there is another which has been outlined, and is not yet complete, in Vermont—another horse-breeding experiment.

Mr. HASKINS. That is the Morgan horses?

Mr. MELVIN. Yes, sir. Then there is poultry breeding at the Maine experiment station, and milch goat breeding at the Maryland and Connecticut stations; and there are one or two others. I will have to refer to my notes to give you details.

Mr. BROOKS. There is one in Alabama, is there not?

Mr. MELVIN. That is a cattle-feeding experiment.

The CHAIRMAN. I see that what we feared last year is about to take place. We have started these demands from every experiment station. How many demands has this Department from the experiment stations for experiments in breeding and feeding? What other demands are made on the Department? I would like to know how much this has grown in one year.

Mr. MELVIN. Virginia has asked for cooperation in a beef-feeding experiment.

The CHAIRMAN. And for a certain portion of the money?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. Has not Tennessee done the same thing?

Mr. MELVIN. No, sir; I believe not.

The CHAIRMAN. I thought Tennessee wanted to breed some cattle, such as would fit their East Tennessee plateaus.

Mr. MELVIN. If so, it came before my time as chief. New Mexico wants to engage in some horse breeding.

The CHAIRMAN. They want something for horse breeding?

Mr. MELVIN. Yes, sir; and Minnesota.

The CHAIRMAN. Also for horse breeding?

Mr. MELVIN. No, sir; that is a combined milk and beef breed of cattle.

The CHAIRMAN. They all want the aid of the Agricultural Department, do they not, to establish these experiments?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. They all want some money out of the appropriation?

Mr. MELVIN. Yes, sir; I think usually they consider about half. That is, the facilities they furnish, assistants, and the feed, and so forth.

The CHAIRMAN. Have you any idea of the demands before the Department to aid in the experiments of breeding and feeding? Have you any idea how much it would take to meet those demands?

Mr. MELVIN. No, sir; I could not make an estimate.

The CHAIRMAN. In round numbers, could you approximate it in any way? Would it be \$100,000, \$200,000, \$50,000, or \$70,000?

Mr. MELVIN. I should think probably \$40,000 would meet all those demands.

The CHAIRMAN. Would cover the present demands?

Mr. MELVIN. Yes, sir.

Mr. BROOKS. In other words, the requests from any one place are not large at present?

Mr. MELVIN. No, sir; they are all moderate. This Minnesota breeding experiment is cooperative. That is, it is suggested to be cooperative—because it is not yet in operation—between the Department and the experiment station and certain breeders who enter into an agreement with these two bodies; and the animals are to be distributed among this association of farmers, and the breeding stock is to rotate between them. The cost of selection, and a part of the cost of procuring these animals, is to be paid jointly by the Department and the State of Minnesota, but the principal cost for animals will, of course, be on the owners of the animals. These animals are to remain within the association, and can not be disposed of except by the joint concurrence of all interested.

The CHAIRMAN. Now, take up the cost of the Colorado experiment in breeding horses; what have they done there? Just tell the committee about that. I appreciate the fact that you have just succeeded Doctor Salmon, as chief of the Bureau, and some of the details you may not be able to fill in.

Mr. MELVIN. No, sir; I do not know all about that. I expect to visit Colorado the last of this month, at the time of the National Live Stock meeting at Denver, and to have familiarized myself with the details at that time. If I could appear before you after that, I would be more capable of giving you full information.

The CHAIRMAN. Just from your knowledge of it, I understand they want more money to continue that experiment. What more is there to do than to couple these animals, and then await results?

Mr. MELVIN. Well, I can not say at present, unless it should be to extend or enlarge upon the experiment.

The CHAIRMAN. What is the use of extending it until you get a solid basis to start from? I might say that I visited the place this summer, and saw those horses. Suppose that this stallion, for instance, proves a poor getter, and you buy a lot more mares? What can you do? You are simply wandering in the dark. You must get a stallion and mares that are prepotent—that breed like themselves—and then you have something to start from. But this thing of buying a lot of mares and some stallions, without knowing about that, is not what should be done in my judgment. You are going to do nothing in that way to establish prepotency; because if you do pick five or six foals out of the offspring of such a lot of mares there is nothing to insure that those foals will themselves prove prepotent or breed like themselves.

I think these experiments should go slowly. There is a good deal of chance about getting prepotent stallions and mares.

I went up there this summer and saw all those mares, and I would not give a dollar and a half for seven out of that lot, as mares from which to establish a breed of horses. The stallion is an excellent animal. You could not have better. There are seven or eight mares out of the fourteen that will do. I am speaking from my own judgment as a breeder when I say that. The other six or eight of those mares I would not attempt to establish a breed of horses from. I would not keep them. I would throw them away. They are simply an expense. I will give you some mares myself that are as good as

or better than those mares if you want them, and you can work with them if you like.

Mr. BROOKS. The conclusion of this is that three-quarters of that stud is in good shape, as I understand from your statement, Mr. Chairman. That for the first year's experiment the horse and half of the mares are all right?

The CHAIRMAN. No, sir; I said that seven or eight out of those fourteen mares that I saw I would not take the chance on of trying to establish a type of horse from them. The stallion is excellent. And now you come to the question, will they be prepotent; will they breed like themselves? They are types, all right, but whether they will breed like themselves—whether they will be prepotent—is another question.

Mr. BROOKS. The statement was made that that horse has had an experience in the stud; that he has been bred to 21 mares, and has gotten 19 colts.

The CHAIRMAN. That does not bear on this point at all. If he does get colts it does not mean that he will be prepotent—that is, that he will sire colts that will be like himself. The object of such an experiment as this is to get mares and stallions that are prepotent. You have selected a certain type of stallion and mare to establish a type of horse from.

The trouble with the German and French coach horses is that they are not prepotent. They are beautiful horses to look at, and they sell for high prices and they fool the farmer. They are brought over here hog fat, so that every defect is covered, but they have not proved to be prepotent.

Mr. BROOKS. I understand that Mr. Melvin is not familiar with the details of this experiment.

Mr. MELVIN. No, sir; I am not.

Mr. BROOKS. You do not know that what the Colorado experiment station wants is a very ordinary, a very reasonable amount of money for the support of this station, and enough, perhaps, for the purchase of one or two more mares; that there is no idea of purchasing another stallion at present? Now, I suppose that you do not know that the fact is that the mares now at the station were bought by an agent of the Department and were viséed by Doctor Hayes, the assistant secretary of the Department, and that they include several prize winners; that there are among them six or eight Madison Square horse-show winners and live-stock show winners, and—

The CHAIRMAN. Is that all one question that you are asking?

Mr. BROOKS. No, sir; I am simply stating facts in regard—

The CHAIRMAN. You had better take it up in detail, then, I think.

Mr. BROOKS. Will you not allow me to finish the question?

The CHAIRMAN. It is a pretty long one to answer by "What does he know?" I would like to know whether Doctor Melvin can answer it in the form in which it is asked?

Mr. BROOKS. I want to know whether Doctor Melvin is advised, himself, on those things. There is only one thing more I care to put in that question:

And that thus far the experiment has only reached the stage of getting the stud together and starting?

The CHAIRMAN. The mares are in foal; that is all. That is as far as you have gone?

Mr. MELVIN. Yes; I understand so.

Mr. BROOKS. The State of Colorado has no idea, I would say, of appropriating to itself this \$25,000. Several years ago I stated that we believed we had certain advantages of locality and situation that would make it a good place to start an experiment of this sort. I believe that a series of experiments can be well handled and carried on there, and I do not want \$25,000 for them, but I do not want this college in Colorado left to carry on the maintenance of these experiments without any help from the Department—I am perfectly willing to leave that to Doctor Melvin and the Secretary—but neither do I want the whole expense of it settled on the experiment station and on the shoulders of the people.

As I understand the Secretary—and I have talked with him many times about this—his idea is to establish two horse-breeding stations, one in the East and one in the West; and that is more or less in response to the suggestions of the President of the United States made in Denver, of which, when the time comes, I will present a copy to the committee; and that even in the South, in two sections, or perhaps three, a series of experiments should be carried on with cattle and with hogs, and that possibly that should be extended to the arid regions. I think that New Mexico is conducting an experiment with regard to Angora goats, is it not?

Mr. MELVIN. No, sir. They have made an informal request for an experiment with horses.

Mr. BOWIE. Can you tell me how much is expended on these stations?

Mr. MELVIN. The amount apportioned is nearly \$24,000.

The CHAIRMAN. In order to get to that, how much did these mares cost?

Mr. MELVIN. Various sums. I have a memorandum here on that. They were purchased from last year's appropriation.

The CHAIRMAN. Please give the details of their cost.

Mr. MELVIN. There were two mares purchased at \$600 each, five at \$500, three at \$400, two at \$300, and six more at \$400.

The CHAIRMAN. What is the total cost?

Mr. MELVIN. Including the stallion, at \$3,500, it is \$11,400.

The CHAIRMAN. The stallion cost \$3,500?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. Those mares are now in foal?

Mr. MELVIN. Yes, sir. They are thought to be.

Mr. BOWIE. Do I understand that some of the mares were given to the station?

Mr. BROOKS. I think there are two of these mares which were given.

The CHAIRMAN. How many mares are there at that Colorado station?

Mr. MELVIN. There are eighteen mares there.

The CHAIRMAN. I was only shown fourteen mares when I was there.

Mr. BROOKS. There are sixteen or eighteen. There are two mares that are loaned, and do not belong to the Government. They are loaned to the station. There are two mares that were given, and those are from the Diamond Ranch, in Wyoming. The Rainsford strain is a very well-known breed, bred by a brother of Doctor Rainsford, of New York, and from which a very large number of prize

winners have come. The Vanderbilt stables are replenished from Rainsford's strain each year. These were four of his finest mares, he said. He declared that he would not sell them for any \$400 apiece; he would sell them for \$600 apiece. The representative of the Department said that he could not buy them for that amount of money, and Rainsford said "Very well; I will put in two scrubs with these four mares, and we will make an average of \$400 apiece."

The CHAIRMAN. What amount of money should be expended there before you get results? Do you think it is policy to enlarge, and buy more mares and more stallions?

Mr. MELVIN. The results can be arrived at more quickly by having a large number of animals; not much larger, but somewhat larger.

The CHAIRMAN. Why should the result be arrived at more quickly in that way?

Mr. MELVIN. This experiment is a matter of selection, and in all probability there will be some of the foals that will not be continued in the experiment. That is, they will not be up to the type, and they will be excluded from the experiment.

The CHAIRMAN. Perhaps all of them will be. You can not tell what your stallion will do. Would it not be well to await the results of the experiment on the present scale?

Mr. MELVIN. A sufficient number of animals should be had to continue the experiment.

The CHAIRMAN. Do you not think that 14 or 16 animals are sufficient to start in to find out what you are going to do?

Mr. MELVIN. That is a good start.

The CHAIRMAN. If you have 5 or 6 stallions and 50 or 100 mares, you may have colts that look alike; but that does not prove that their descendants will be alike again.

Mr. MELVIN. No, sir; but by selection it is expected to obtain such results.

The CHAIRMAN. Now, there is no horse which presents such differences in form as the American trotter of to-day, is there? You go into the stables of the United States and you will find that they trot and pace in all shapes and forms. Now, this is a standard-bred horse which they have at the station in Colorado, and I am not saying anything against him. He is an excellent horse; one of the best horses I have ever seen, I would say.

Mr. TRIMBLE. What breed of horses are they experimenting with?

The CHAIRMAN. They want to establish a hardy, regular, good-footed carriage type of horse that will stand the pavements in cities.

Mr. BROOKS. I have the photographs and pedigrees of all the horses at that farm. I supposed that what we wanted at this time was to hear the representative of this Bureau of the Agricultural Department.

Mr. TRIMBLE. What breed of horses are they experimenting with out there, the English or the German coach horse?

The CHAIRMAN. Neither; they are attempting to establish a special breed of horses.

Mr. TRIMBLE. What breed of stallion have you?

The CHAIRMAN. The stallion is a standard bred trotting stallion. Is not that so, Mr. Melvin?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. The mares, as I understand, are not pedigreed stock. They are picked for their conformation, without any particular knowledge of their pedigrees?

Mr. MELVIN. They are trotting and thoroughbred stock.

The CHAIRMAN. Yes; they are not standard bred, as we call it; but there are six or eight of them which are very good mares.

Mr. BROOKS. The stallion is Lawson's "Glorious Thunderbolt."

The CHAIRMAN. The question is whether this stallion would be prepotent of his own conformation. That is a thing that you can find only by years of experimentation. You have to wait and see whether fillies by him will produce his type. The French and Germans have gone on for fifty years with this kind of experiments, and yet the French and German coach horses are not prepotent. The object of having such a stallion as this is to establish a prepotent line of sires that will reproduce their own type. The Germans and the French have not succeeded in producing prepotent sires. That is the point that I make.

Mr. BROOKS. They have the pedigree of those horses for something like six generations. So far as the horses coming from the Rainsford stables are concerned it is just as though the Government had been carrying on its experiments for all that time. The fact is that that section out there produces a horse with very strong wind. The high altitude gives them more lung power. They have tremendously hard feet also, and they have endurance which is wonderful. Everybody knows what the mountain pony is. Their endurance and their feet are wonderful, and their wind is something way beyond that of horses of the lower altitudes.

The CHAIRMAN. That is not the question. The point is, how will those horses and their descendants be when they are brought down into the lower altitudes?

Mr. TRIMBLE. Why should you buy a stallion that had been tried at a lower altitude and take him there?

The CHAIRMAN. The Department is responsible for the statement that he had never begotten but three or four colts; but he has proved himself all right now, in the invigorating altitude of Colorado.

Mr. BROOKS. Their thought was that by taking this standard-bred horse and selected mares and putting them under the climatic influences that prevail in Colorado, just as Rainsford has, they could produce something like the mountain pony—that is, produce a horse with the training and strength and speed and carriage, and all that.

This is not a new matter. Rainsford has been trying to do the same thing. He has taken some standard-bred horses from New York and run them out on the range. And that was the occasion for the criticism that was first broached here, that the Department had gone and bought 6 branded range mares, at \$400 a piece. Dr. Rainsford has 25,000 acres of land, part of it under fence and part of it not. Therefore the foals are branded, and they let them run on the range.

They have been trying to do the same thing that the Department is attempting to do, and the idea of a good many of these men is that under these conditions they can do something toward establishing a type that will have the form and will still have the style, the action, and the strength and the courage of the ordinary horse, with the good elements of the mountain pony; and, as I say, I did not suppose this discussion was coming up to-day, or I would have had these photo-

graphs here. I have the data on the breeding of every one of these horses and their photographs, and also the opinions of a large number of men who are not interested in the matter, and whose judgment is usually considered as of some avail in matters of breeding. I must take issue with the honorable chairman on his statement that there are only eight of these mares that should have been considered for this experiment.

The CHAIRMAN. In the face of the failure of the German and French Governments to establish a type of coach horse, what do you think as to the hope of success in this experiment? They have been at that for fifty years, I think. I will not be certain about the length of time, but I am sure that I have known the French coach horse for the thirty years that I have been a breeder of cattle and horses.

Mr. MELVIN. I think that if an experiment of this sort should be continued for twenty-five or thirty years an excellent type of heavy harness horse would be obtained.

The CHAIRMAN. Why do you think so, in face of the result of the experiments of the French and German Governments?

Mr. MELVIN. Because these horses are of a different strain. They have largely come from the Arabian, which is undoubtedly a stronger line than that of the French and German experiments.

The CHAIRMAN. They have the Arabian blood in them.

Mr. MELVIN. Not so largely as these have it.

The CHAIRMAN. So far as I know and so far as I have been able to learn the French and German coach horses have the greatest mixture of breeds that you ever heard of, and they produce a beautiful breed of horses. But the trouble is that they are not prepotent.

Mr. TRIMBLE. Were all these mares of the same type and breed of horses; were they all trotting bred—these mares that you are breeding this stallion to?

Mr. MELVIN. Not altogether, but there is a trotting strain in most of them, I think.

Mr. TRIMBLE. I think it might perhaps be better to get different breeds of mares, and perhaps trotting stallions and thoroughbred stallions.

The CHAIRMAN. The coach horse must have action as well as the proper conformation. The thoroughbred has not any action. Doctor, is it the opinion of the Department that it is necessary to buy more mares and stallions for the Colorado experiment?

Mr. MELVIN. It has not been presented in exactly that light.

The CHAIRMAN. If this provision is made, is it the intention to allot a certain proportion of the appropriation to the Colorado station for the purchase of more mares?

Mr. MELVIN. It is not so determined.

The CHAIRMAN. It is not so determined or thought of at all?

Mr. MELVIN. Not definitely.

The CHAIRMAN. What have you done with the experiments in chickens in Maine? What is the object to be attained there? I saw somewhere that it was a 200-egg hen.

Mr. MELVIN. Yes, sir; a hen that will produce on the average not less than 200 eggs a year; and also to determine the amount of space required for such hens, and to work out problems along that line with reference to food and space and ventilation, and so forth.

The CHAIRMAN. Has not all that been done by people who breed chickens for the hotels in New York? Have not they solved the problem of what space and what food is proper?

Mr. MELVIN. That is all incidental to the breeding of these hens.

The CHAIRMAN. That, as I understand it, will be a mixed breed again. It will be a combination of several breeds, probably.

Mr. MELVIN. The idea is to establish a definite breed from different breeds.

The CHAIRMAN. Chickens breed more to a line than any other thing, and they lose the breeding quicker than any other. The least infusion of another blood, and they go all to pieces. Whether they will breed to the line of egg producing I do not know. The hen that will give 200 eggs a year must be a pretty strong constitutioned bird, and a pretty active bird.

Mr. MELVIN. They have already produced hens that will do that, but the idea is to produce others, which will establish a breed of chickens that will do so.

The CHAIRMAN. How much have you allotted to that experiment?

Mr. MELVIN. One thousand dollars.

The CHAIRMAN. What has been done with the milch goats? I saw in the papers that you had made an importation of goats.

Mr. MELVIN. We made an importation of milch goats from Malta. There were 68 of them. After the importation of these goats it was suggested by the English commission sent out to the Island of Malta that these goats were the conveyers of Malta fever, and on that account we have not used them in any experiments.

The CHAIRMAN. You have quarantined them?

Mr. MELVIN. Yes; they are still in quarantine, and we have not permitted the use of the milk in any way, and will not, until we determine whether that was a fact or not.

The CHAIRMAN. How are you going to determine that unless you use it on some poor fellows?

Mr. MELVIN. By an analysis of the blood and the urine, that can be determined, you know.

The CHAIRMAN. Yes.

Mr. HENRY. Those goats were imported and brought into this country?

Mr. MELVIN. Yes, sir.

Mr. HENRY. They have not arrived yet; they are still in quarantine?

Mr. MELVIN. Yes, sir; the ones for Connecticut are at a quarantine station in New Jersey.

The CHAIRMAN. So that you really have not done anything on that line yet?

Mr. MELVIN. No, sir. The goats are in the country, and to bring them here is all that we have done toward using the milk.

The CHAIRMAN. Were these 68 goats purchased from that item of \$25,000?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. What other expenditure has been made under that item?

Mr. MELVIN. There was an experiment in beef feeding, I believe. That was in Alabama. That was not a very extensive experiment, though.

The CHAIRMAN. What did the Government do there? What share of the expense did they bear?

Mr. MELVIN. I think our proportion was about three-quarters at that time.

The CHAIRMAN. Three-quarters of the cost?

Mr. MELVIN. Yes, sir.

Mr. BOWIE. What was the total cost?

Mr. MELVIN. Two thousand dollars—

The CHAIRMAN. Then the bulk of this money has been expended in the horse experiment in Colorado. Has anything been done in Vermont yet?

Mr. MELVIN. Yes, sir; we have allotted \$5,000 toward that experiment. There have been no horses purchased yet, however.

The CHAIRMAN. None have been purchased?

Mr. MELVIN. No, sir. Then as to that \$5,000, there has been some money expended for the preparing of quarters for them, but nothing further has been done as yet, although we have apportioned \$5,000 for this.

The CHAIRMAN. Five thousand dollars there and \$11,000 in Colorado, you say?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. That makes \$16,000, and it only leaves you about \$9,000?

Mr. MELVIN. These others are not very expensive. This year's expense in Colorado will be \$3,500.

The CHAIRMAN. And no horses have been bought yet in Vermont?

Mr. MELVIN. No, sir.

Mr. BOWIE. It will not be necessary to spend \$11,000 every year in Colorado, of course?

Mr. MELVIN. No, sir. The great expense has been gone through with there, I think.

The CHAIRMAN. Are there any other questions the members of the committee want to ask Doctor Melvin along this line—of the breeding appropriation? The maintenance of these horses at any station ought to be largely provided for by their work. Their work ought to pay for their feed, ought it not? I was at the Colorado station when 2 of the horses were being used in the carriage there and for work on the station, and the others could be drawing hay and doing other light work, so that the cost of their maintenance, of their feed, would be repaid in that way at the Colorado station or any other station. I will not say the Colorado station, but the Vermont station, or any other station where these breeding operations are going to be undertaken; might not mares be employed in doing light work and pay their way? I see no reason why that should not be so.

Mr. MELVIN. I do not know how much work they would have for them.

The CHAIRMAN. I was at the Colorado station, and they have an experimental station there, and there is a lot of light work to do—light plowing, plowing corn, and between rows of beets, and they can do that very well.

Mr. BROOKS. There is a good deal of work that they can do, and I think they do it.

A gentleman suggests that some of those mares are not broken. The range mares are not broken.

The CHAIRMAN. Some of these mares on the Colorado farm are not broken?

Mr. BROOKS. I think four of the mares are not broken. But they do a certain amount of light work. Of course there is not a great amount of work to do on such a place.

Mr. BOWIE. Do you think there is enough to justify sharing the expense of the thing to the station from the Department?

Mr. BROOKS. I would not want to say that, because I am not advised; but I think there is no doubt that they do considerable work there.

The CHAIRMAN. The States seem to be always willing to do everything if somebody else will pay for it. I know that my mares pay for their keep, and raise their colt besides, every year. I simply wanted to find out whether there was any actual expense for keeping, and if the mares did not pay for their keep themselves.

Mr. BROOKS. I doubt whether there is sufficient work at that agricultural station to keep eighteen horses busy all the time, in addition to their work horses, which necessarily they must have. I think they have quite a number of work horses in addition. I should not suppose it would be good judgment to dispose of the work horses and rely upon these brood mares for the ordinary heavy work of the station.

The CHAIRMAN. I think Professor Carlisle said, "If you will give us a male we will take care of it, and make experiments; if you will give us the male and the female, we will go on with it." Do you not remember that was what they said here?

Mr. BROOKS. No; I do not recall it.

The CHAIRMAN. I do, quite strongly. They said that if the Government would buy a stallion and the mares they would go on with the experiment.

Mr. BROOKS. I do not think the Colorado station asks or expects any large part of this appropriation, but I do not think that it should be precluded from some part of it that would be necessary for its ordinary maintenance. Neither do I think, if the Department deems it wise, to put another mare or two mares into that string, that they should not be able to do it. The main point is that all this appropriation, or the main part of it, should not be settled on the agricultural station at Fort Collins. I think that is a good thing, and I think experiments of this sort should be started either there or somewhere else.

The CHAIRMAN. I have had no faith whatever in this experiment, in view of the experience of the German and French Governments; and with their experience before me, I think it is very doubtful that the horses bred in that climate will originate a breed which, when you take them and breed them in another climate—for instance, in the black prairie soil regions of Indiana or in the hot climate of the South—will maintain itself. I think the German and French experiments have been failures, and no one else knows how these horses will behave when you come to breed them in other climates.

Mr. BROOKS. Do you think the experiments of the French and German Governments have been failures?

The CHAIRMAN. Yes, sir.

Mr. BROOKS. Do you think that the type of horse is better in those countries for the work that those Governments have done?

The CHAIRMAN. They have not produced a prepotent stallion that will breed like himself, and therefore the experiment is a failure, so far as establishing a breed is concerned.

Mr. BROOKS. They have made the general strain of horses throughout those countries very much better than it would have been if the Government had not conducted their experiments?

The CHAIRMAN. They have picked out their best and they have exported them and put them in the carriages, but they have not produced prepotent stallions.

Mr. BROOKS. If this Government stops its experiments because some other government has failed, it will be the first time that this Government ever did a thing like that.

Mr. ADAMS. On the same line, on the same general principle as this matter of the experiment stations, the German experiment stations and scientists, after a long experience, decided upon the proper ratio of the carbon and heat-producing elements in the ration of the milch cow. That was accepted in the United States and in agricultural colleges and stations in the United States for a great many years.

I must confess that when I was a farmer, and observing the effects of this carbonaceous ration on the cows, I became very skeptical about the truth of this German formula, and I said openly that I doubted the correctness of these tables. In recent years very careful experiments have been performed at the Minnesota station which seemed to upset all those theories; and, in fact, in other respects, showing that the ratio may be one-seventh of these carbonaceous and heat-producing elements; and yet you will get as good results, and perhaps better results, than under the old German formula; which indicates that scientists in other lines, with the best of purposes and the highest of ambitions, may be mistaken, and in the light of more modern knowledge we may come to some other result.

The CHAIRMAN. Do you not think that might be a result of the difference in climate, and do you think that the effects would be so marked as that, in the matter of breeding?

Mr. ADAMS. So far as the principles of breeding are concerned, so far as the transportation of animals from one altitude and from one climate to another is concerned, they will not do as well, it seems to me. I think the study of breeding can not be confined to any altitude or to any land. This very thing of prepotency that you speak of in breeding, of course, is vital, and the aim of the breeder always and everywhere, whether with cattle, horses, sheep, or hogs, is to establish the prepotent element in the animal. You take the Holstein cattle. They have been very skillfully bred, and they have an enormous constitutional power, and they have the characteristic of being able to transmit to their offspring their own characteristics in perhaps a greater degree than any other breed of cattle.

The CHAIRMAN. I think the Hereford has that just as much. If you breed the Hereford bull to anything he will mottle the face. He will surely put the white in the face.

Mr. ADAMS. My idea is that the French and German breeding has been with altogether too much latitude, and they have not held carefully to the principles of breeding.

The CHAIRMAN. I do not know about that, but after fifty years of experiments they have not succeeded at all. Right in the line of what Mr. Adams has said about cattle raising, and so forth, for years and

years it was agreed the best way to fat a steer was to keep him in a warm place. Now, here comes along the Iowa station, within a year or two, and makes experiments and finds out that a bullock out on the hillside, in the cold and the sleet, gained more per pound than the animal in the stable. That knocked into a cocked hat the theory that had prevailed for years and years. I do not myself understand why that is so; but that was the result of the experiment.

Mr. ADAMS. I think this is the reason of that: As they commonly feed steers, they put a lot of corn into them, and they receive more of the heat-producing elements of food than they can take care of.

The CHAIRMAN. And they want the cold to work it off?

Mr. ADAMS. Yes.

Mr. LEVER. Will you allow me to ask Dr. Melvin what progress he has made in the dairy work particularly?

Mr. MELVIN. The dairy work in the South has been more educational than anything else to the present. We have had a man there attending different institutes and conventions, and delivering lectures along the line of dairying.

Mr. LEVER. What are your plans for the future in respect to that work?

Mr. MELVIN. There has been a plan marked out by the chief of the dairy division, in which he expects to enter into cooperation with progressive dairymen in the South, and that cooperation will consist of advice with reference to the modern methods, and tabulating all the information concerning the production of milk and butter; and this information collected will be distributed among all others who wish to follow along those lines. That is about the line of the proposed work in the South on dairying.

Mr. LEVER. How much have you estimated for that work? It is about \$7,000 or \$10,000, is it not? I think it is \$7,000.

Mr. MELVIN. \$7,400.

The CHAIRMAN. Mr. Adams, is it not true that 90 per cent of the butter of commerce to-day is creamery butter?

Mr. ADAMS. I should doubt whether the percentage was quite as large as that.

The CHAIRMAN. Whatever it is—75 per cent, would you say?

Mr. ADAMS. There is a large amount of renovated butter on the market in this country.

The CHAIRMAN. My point is that notwithstanding all the teachings in regard to the making of butter on the farm the farmer has found it more profitable to sell his milk to the creamery, and the result has been a better and more uniform product.

Mr. ADAMS. That is true.

The CHAIRMAN. Because every farm varies in its facilities for making butter, and every farmer's wife varies in her aptitude in making butter.

Mr. ADAMS. Here is the fact about it. The average farmer, having an average number of cows—he not being a specialist, but desiring to keep a certain number of cows—has some milk to dispose of, and he takes it to the creamery. Also many dairymen, who prefer to have their butter made up in the creameries, take their milk there. But the men who make absolutely the most money in the business, and who make absolutely the finest product that can be made, are dairymen who are specialists, and who make that their main busi-

ness, and who of course have the appliances and the machinery and the knowledge and the necessary capital, and who have the absolute control of the cows which produce the milk; and they can produce more absolutely perfect butter, and can make more money out of it, than any other farmers.

The CHAIRMAN. What percentage is that of the whole?

Mr. ADAMS. The percentage of that particular class is rather small.

The CHAIRMAN. Is it 5 per cent?

Mr. ADAMS. It would be almost impossible to estimate it. For instance, you have men up in New York who are making butter, uncolored, of pasteurized milk, of the very highest grade, and are able to obtain contracts for all they can make at 40 to 50 cents a pound, the year around, and are unable to supply the demand. There is that kind of work being done. In my State—to illustrate the change in the dairy product—in 1887, when I went into the institute work there after thirteen years on the farm, during which time I had been running that business, and when at the request of some of these people I went into the work, we were making 60,000,000 pounds of butter a year; and we made careful estimates, and according to our judgment 16,000,000 pounds of that was first class and 40,000,000 pounds was common, indifferent, or poor. In 1905, according to the best figures we can make, we are producing 100,000,000 pounds of butter. Of course in various portions of the South they have one serious thing to contend with—the lack of pasturage.

The CHAIRMAN. And the climate—lack of ice?

Mr. ADAMS. I do not believe that the effect of the climate would be such that they could not carry on butter making and make it at as low a cost as we can. As for pasturage, on forage and silage they could make even more out of it than we do, with the proportion of area of the farms that we have to have in pasturage.

The CHAIRMAN. I think 90 per cent of what is called "farmers' butter" is traded out at the stores by the farmers, and goes from there into renovated butter. It is traded in at the groceries and stores in the country and in small towns. The farmers go in and trade it for teas and sugars and different articles, and it then goes from those groceries and stores to the renovated-butter factory. In other words, our farmers do not make good butter, as a rule. In exceptional cases they do. The people who make this exceptional butter make a great deal of money, but they have to have certain facilities, and they have to have a certain amount of capital to do it with. But the great proportion of farmers' butter ends as renovated butter.

Mr. LEVER. I would like to ask Dr. Melvin if he thinks that the Southern people can succeed in the dairy business?

Dr. MELVIN. That is the opinion of our experts in dairying.

Mr. LEVER. The prospects are good to develop a dairy industry in the South?

Dr. MELVIN. Yes, sir.

The CHAIRMAN. I think the prospect is as good there as in the North, because you can establish creameries if you can not succeed on the farm. I do not believe you will ever succeed on the farms, any more than we have succeeded. I do not think our butter making on the farm can be called a success.

Mr. CANDLER. Is there cooperation in this with the agricultural colleges?

Mr. MELVIN. Not involving expenditures, except some traveling expenses.

Mr. CANDLER. These lecturers have the benefit of what investigation has been made, and they give the farmers of the country the benefit of these lectures?

Mr. MELVIN. Yes; in farmers' institutes and similar meetings.

Mr. CANDLER. Do you know whether you ever had anybody at the Agricultural College of Mississippi, or not?

Mr. MELVIN. Yes; I think our Mr. Rawl has been there.

Mr. CANDLER. They have a fine herd of cattle there and have made various experiments along this line. I thought that if you had not anybody there, you might have in the future.

Mr. LEVER. As a matter of fact, you did not have but \$3,000 set aside for this purpose during this last year?

Mr. MELVIN. Yes, sir.

Mr. LEVER. But you had Mr. Rawl there?

Mr. MELVIN. Yes, sir.

Mr. LEVER. Your idea is to increase the number and put more of these inspectors and educators down there?

Mr. MELVIN. Yes, sir.

Mr. LEVER. And they are to cooperate with the individual dairymen as they find them through the country?

Mr. MELVIN. Yes, sir.

Mr. LEVER. Do you think \$7,000 is enough for that purpose?

Mr. MELVIN. Yes, sir; I presume it would be, for the next year. A larger amount was desired by the Dairy Division, but was afterwards reduced to \$7,400.

Mr. BOWIE. Have you carefully considered the amount of money to be used for that purpose of which Mr. Lever speaks?

Mr. MELVIN. I should think that would be commensurate. Of course it is all along a new development.

The CHAIRMAN. The expense is mostly for traveling expenses, I believe; they have the men to do the work with?

Mr. MELVIN. The expense will be for salaries and traveling expenses.

Thereupon the committee adjourned until Thursday, January 18, 1906, at 11 o'clock a. m.

COMMITTEE ON AGRICULTURE,
Thursday, January 18, 1906.

The committee met at 11 a. m., Hon. James W. Wadsworth in the chair.

DR. ALONZO D. MELVIN, CHIEF, BUREAU OF ANIMAL INDUSTRY, ACCOMPANIED BY MR. CLARENCE B. LANE, ASSISTANT CHIEF, DAIRY DIVISION, DEPARTMENT OF AGRICULTURE, APPEARED BEFORE THE COMMITTEE.

The CHAIRMAN. When we concluded on the day before yesterday, we were talking about the dairy industry in the South, and what you were doing along that line for the development of the South, and I

think Mr. Lever asked the question how much money you set aside for that work?

Dr. MELVIN. All is included in the large amount appropriated for our work.

The CHAIRMAN. It is taken from the main appropriation?

Dr. MELVIN. Yes, sir. That amounts to \$7,400 for fieldwork.

The CHAIRMAN. The appropriation for the Department is made in a lump sum and the Department divides it up for certain work as it sees fit.

Dr. MELVIN. Yes, sir.

The CHAIRMAN. And there was appropriated last year, how much? There was expended along that line \$7,400.

Dr. MELVIN. That is, for the current year.

The CHAIRMAN. You mean for this year?

Dr. MELVIN. For the year 1906-7. This is the estimate for 1906-7.

Mr. FIELD. What was the amount expended for 1905-6?

Dr. MELVIN. \$3,050.

Mr. FIELD. So this is an increase of \$4,000, approximately?

Dr. MELVIN. Yes, sir. The chief of the dairy division desires that this amount be larger in order that these instructors may meet with a larger number of people in the South. The money for this year is expended in the salary for one man and his traveling expenses nearly entirely. The money for the coming year will provide for three men and their traveling expenses. In the opinion of the chief of division it would be necessary for seven or eight men to be provided for instead of three.

The CHAIRMAN. Why is that?

Dr. MELVIN. In order that they may meet with a larger number of people in the South in their work of disseminating information with reference to dairying.

The CHAIRMAN. Mr. Lane, is he Mr. Edwards's successor?

Dr. MELVIN. No; he is the assistant chief of the division.

The CHAIRMAN. Who is the chief of that division?

Dr. MELVIN. Mr. Webster. He is out of the city at present.

The CHAIRMAN. Could Mr. Lane give us a general idea of what he proposes to do?

Dr. MELVIN. Yes, sir.

The CHAIRMAN. I think he might as well be heard right now.

Mr. LANE. It has already been said that the work in the South during the past year has all been conducted by one man, and all the money that has been expended was for this one man's salary and traveling expenses. He has traveled through the South, through a number of States, looking up localities and farms where the work of instruction could best be carried on, the object being to establish demonstration farms at different places throughout the South and to supply these farms with the necessary apparatus to carry on the work. the Babcock test and the scales, and to arrange to have them keep records of their herds, the feeding and caring for them, and the taking care of their produce; and after one farm has been brought up to a good condition of increase it will serve as an object lesson to the farmers in the vicinity. He then travels around to another place and establishes another farm and puts it in shape and lets that serve as an object lesson.

The CHAIRMAN. Is it proposed to make improvements on anybody's farm; to put in a butter plant on an individual's farm?

Mr. LANE. If he is making butter, yes, sir; but just to follow up the line of farming he is working on. Of course on some farms they make butter, and on other farms they just handle the milk and ship it.

The CHAIRMAN. There is no intention of putting up a little creamery at the Government's expense?

Mr. LANE. No, sir; on some of the farms we are building silos.

The CHAIRMAN. The Government is building them?

Mr. LANE. Yes, sir. We have three silos now constructed by our architects as model silos for dairymen in that vicinity.

Mr. HENRY. Where are those silos located?

Mr. LANE. One is in South Carolina. In fact, all three are in the South.

The CHAIRMAN. And the Government is building silos on private property?

Mr. LANE. The silo belongs to the man who owns the farm, but we guarantee them against loss.

The CHAIRMAN. Who pays the cost of the silo?

Mr. LANE. The man on the farm. We tell him how to build it.

The CHAIRMAN. And the Government does build it?

Mr. LANE. The Government simply directs the building.

The CHAIRMAN. The Government estimates the cost of the building?

Mr. LANE. Yes, sir; the Government estimates the cost, and in case the silo is not a success they guarantee him against loss.

The CHAIRMAN. How do you get at whether it is a success or a loss?

Mr. LANE. If the silo does not keep the silage.

The CHAIRMAN. You mean whether it is a success in preserving the silage?

Mr. LANE. Yes, sir.

Mr. HENRY. Will you please tell us what the change is from the ordinary plan of building a silo?

Mr. LANE. Yes, sir; one of the silos is made of cement. While that is not a new plan the thickness is not as great as ordinarily. The thickness of the cement is $1\frac{1}{2}$ inches. We use expansive metal and cement. A framework is built up first to support the cement while it is being built, and after the cement is once set the framework is taken down and you have the cement.

Mr. HENRY. The guarantee is that the new method of construction is not a failure?

The CHAIRMAN. As far as the preservation of the silage is concerned?

Mr. LANE. Yes, sir.

The CHAIRMAN. But the owner of the farm pays for the cost of it absolutely?

Mr. LANE. Yes, sir; he does.

The CHAIRMAN. The owner pays the whole cost?

Mr. LANE. Yes, sir; but it is built under our direction.

Mr. HENRY. You have adopted a new method of construction, and you guarantee that the new method shall be a success; that is it?

Mr. LANE. Yes, sir.

Mr. HENRY. There is no guarantee about putting up the silage; that is too old?

Mr. LANE. Not the putting up of silage; it is the new method of the construction of the silo.

Mr. HENRY. Where have you built these silos—all in South Carolina, all three of them there?

Mr. LANE. Yes, sir; at three different points. We have just begun upon that work.

Mr. HENRY. Why did you select one locality to put up all three of the silos?

Mr. LANE. Because the man wanted three silos.

The CHAIRMAN. Were the three silos put up on one man's farm?

Mr. LANE. Yes, sir.

The CHAIRMAN. He owns the three buildings?

Mr. LANE. He owns the three silos. They are three small silos.

The CHAIRMAN. What was the cost of the silos to that man?

Mr. LANE. Those silos will cost about \$400.

The CHAIRMAN. Apiece?

Mr. LANE. No, sir; the three of them. They are not expensive. They are very small.

Mr. HENRY. How many tons will they hold?

Mr. LANE. About 100 tons each. We want to go further with this work in the South, and our architect is now drawing plans for dairy barns, suitable for the southern States, and for buildings for storing and taking care of the milk and to help the farmer along generally.

Mr. HENRY. I presume that this new plan of silo would not be successful in the North—the silage would freeze. You would not build such a silo in the North?

Mr. LANE. No, sir; we build a different silo plant there.

Mr. HENRY. But you think in the mild climate of South Carolina that silo will be a success?

Mr. LANE. Yes, sir.

The CHAIRMAN. Of course, if it is air-tight it will keep the silage.

Mr. LANE. There is no trouble about that.

Mr. HENRY. It is a frail structure, it seems to me?

Mr. LANE. It seems to be a frail structure, but the architect worked out the plans very carefully, and he is sure it is all right. He has examined it several times since and feels that it promises to be a great success. The principal point is that it is not so expensive.

Mr. HENRY. It seems to me you might have tried one first?

Mr. LANE. We have different models. Then we propose to establish these demonstration farms in the different sections through the South and assist the farmers all along the line.

Mr. BOWIE. In parts of the South they call them "demonstration farms," and in other places they call them "diversification farms." What do you call them?

Mr. LANE. They might properly be called "demonstration farms."

Mr. BOWIE. What is the official name given them by Mr. Steddom?

Mr. LANE. His work so far is independent from ours, because he looks after the production side entirely, while we look into the dairy side—the production of dairy products.

Mr. BOWIE. Your work does not conflict—that is, you do not come in contact with him?

Mr. LANE. No, sir; we work along different lines entirely.

Mr. FIELD. Will you please tell me how it is possible for you to do this work with the appropriation asked for, \$7,000. It took \$3,000

to pay the expenses of one man, and he confined his work very much around South Carolina and confined it to lecturing. Now, with that appropriation of \$7,000 you propose to instruct the southern States through the experimental farms. How can you do that with only \$4,000 additional?

Mr. LANE. I do not think it is enough. This matter has been considered more carefully since the report was prepared, and we have decided since then that we need at least \$10,000 for that work.

The CHAIRMAN. What is the experimental station in South Carolina doing all this time?

Mr. LANE. The first thing we did was to send our expert to the different experimental stations before anything was done, and we said to them: Now, in order to carry on the work in your State we want to do what we can for your dairymen and we want you to cooperate, and will you help us out? They said immediately that they did not have any money, so they could not assist us along that line, but they did say they would be glad to follow the work and to visit the farms occasionally, and to keep in touch with what we were doing. That was about all they could do. We are cooperating with them.

The CHAIRMAN. There has been a bill reported from this committee to give the agricultural experiment stations an additional \$15,000 each, and still when any of these States want anything they come to Uncle Sam. Stone and cement silos have been successful for thirty years. It does seem ridiculous to go to any State and teach them in regard to the construction of a silo.

Mr. LANE. The point is that they did not know silage was a success, and it is a great modern method of construction, and there is always room for improvement.

The CHAIRMAN. There is nothing necessary in a silo except to exclude the air, you know?

Mr. LANE. There is a big difference in the way they may be constructed.

The CHAIRMAN. You have to exclude the air; that is all you have to do.

Mr. LANE. But if we can show that a silo can be built with only 1½ inches of cement in thickness with expanding metal, that reduces the cost about one-half.

The CHAIRMAN. Do you know that I make silage right out in the open?

Mr. LANE. Yes, sir; you can make it that way, but you lose the outside portion of it.

The CHAIRMAN. I do not lose enough to pay the interest on the cost of a silo, nor anywhere near it; but of course I require 5,000 acres of stuff in each pile.

Mr. HENRY. Do you pile it altogether?

The CHAIRMAN. Yes, sir; I make it in that way and do not lose anywhere near what the interest would be on the cost of the silo.

Besides, who is to decide whether the silos are successful or not?

Mr. LANE. The silo itself shows.

The CHAIRMAN. Suppose the proprietor says that the silage is not good, and the cattle will not eat it; suppose there is a controversy, who decides it? That is, of course, a possible claim, though not a probable one.

Mr. LANE. It is possible; but I think there would be no trouble on that line.

Mr. BOWIE. Your superintendence of that new building did not cost much?

Mr. LANE. No, sir; it did not cost anything. Our architect spent a few days down there.

Mr. BOWIE. He was already on your pay roll?

Mr. LANE. Yes, sir.

Mr. BOWIE. So that, practically, did not cost anything extra?

Mr. FIELD. Have you established any demonstration farms during the year?

Mr. LANE. No, sir. The man has been traveling through the States looking over the conditions and locating places and we have just reached the point now where we can start in with this work and know where we can locate farms.

Mr. FIELD. What demonstration will you undertake to make there? You will necessarily build houses and have certain cattle.

Mr. LANE. That is not the kind of demonstration we intend. The idea is to make that a model farm in every way possible, show them how to keep records of their animals, etc. We will show them the methods of feeding which are adapted to southern conditions; we will show them the result of the feeding along the line which we suggest and the method for caring for and handling the milk which the southern dairymen do not know very much about as yet. They are just starting on that line. There are great possibilities in the South and that is the reason we took up the work there rather than anywhere else. They have the soil and climate and they could raise a great variety of crops, a greater variety than can be raised in any other part of the country, and we want to start them along those lines.

Mr. SCOTT. How does it happen that with all their excellent facilities and conditions for profitable dairying the industry there is at such a low stage as compared with its development in other parts of the country?

Mr. BOWIE. That is due largely to the fact that the energies have been spent in cotton; and to another fact that dairy and products of that sort require markets, and they have been far from markets; but the cities are building up very rapidly in the South now, and the question of near-by markets is creating entirely new needs, new conditions, and I have no doubt there will be a great development, due to the fact that manufacturing and commerce are building up cities, and the cities will take things of that sort.

Mr. SCOTT. I asked that question to lead up to this one, which Mr. Bowie's answer does very nicely. Is it not likely that when conditions obtain in the South, as Mr. Bowie has described, such as to make it probable that dairying will be profitable—is it not entirely likely that the industry will develop there naturally and of its own initiative, just as it has in other parts of the country? That is to say, there is not anything about dairying that is a secret. The industry has been well developed in other parts of the country where it is profitable, and now that conditions are becoming such that it may be profitable in the South, why will not the people down there naturally take note of the work that has been done in other parts of the country and develop their industry along the right

lines without any special superintendence or supervision on the part of the Government?

Mr. LANE. They are very slow to take it up. They do not seem to take advantage of what has been done elsewhere.

The CHAIRMAN. They will take advantage of it as soon as they find that there is any money in it?

Mr. LANE. The people from the North and West who have gone down there are taking advantage of it. At the present time the people are buying their milk and butter from the North. They ought to produce it themselves.

The CHAIRMAN. What would we of the North do with our butter if we lost that market?

Mr. LANE. There is always room for first-class butter.

Mr. HAUGEN. What are the principal crops in the South outside of cotton? What can they grow there?

Mr. LANE. For the dairy industry they can grow alfalfa, cow-peas, and sorghum, and crops of that sort, which do better there than in any other part of the country.

Mr. HAUGEN. How much corn can they raise to the acre?

Mr. LANE. About 15 or 20 bushels of green crop to the acre.

Mr. BOWIE. In the United States the average is about 30 bushels to the acre. They do not do that well in the South. They ought to do better, and they are improving very much.

The fact is that in recent years there has been a wonderful development in the South in manufacture, which has occasioned a decided growth in the city population. This tendency has gone on so rapidly that in many of the most important cities of the South, notably in Birmingham, Ala., it is necessary to send butter, chickens, eggs, and similar products frequently across two or three States in order to supply the local market. In the past, diversified farming has not paid in many sections of the South, due to lack of a near-by market. This tendency, however, has been rapidly overcome in recent years, and as a consequence there is great local demand for many things which can be grown in the South, but which are not at this time produced in quantities sufficient to meet the present situation.

It seems to me that if there is any justification for the existence of the Department of Agriculture at all, its illustration is in a case of this character. Here is an absolute demand and an inadequate supply, and the Department of Agriculture is simply endeavoring to coordinate these two propositions, so that the one will equal the other. I have no doubt but that there is great room for improvement along the particular line under discussion, and the Department of Agriculture is wisely expending its efforts in that direction.

Mr. SCOTT. I think I should differ with Mr. Bowie as to the province of the Government in this matter. My understanding of it is that the work we authorize to be done through this Department is and ought to be confined almost entirely to the lines of the development of some industry, something that is new to all parts of the country, and not in teaching one particular section of the country that which has already been thoroughly demonstrated and is well known in another part of the country. It always happens that when a city is suddenly built up there will be a different kind of agriculture than

prevailed in that section when there was no city at all, as we know so well, but it seems to me that the ordinary intelligence of the people could be relied upon to show them the value of substituting garden truck for corn or cotton, and when they come to do that the raising of garden truck is an art as old as Adam and the Government of the United States ought not to be required, and I do not believe it is necessary that they should employ a professor at \$3,000 a year to tell those people that they had better quit raising cotton and corn and go to raising garden stuff, and so forth.

The CHAIRMAN. The people of my section of the country have gone into the milk business in the last four years. They did it not because the Government or anybody came up and told them what to do. Where is your experimental station? Why has it not taken up this work? Why has not the experimental station in your State, the State of Alabama, taken up this work?

Mr. BOWIE. They have done a great deal of work. The best work done in our State that has been done by anybody has been done by the experimental station at Auburn, but their efforts have been restricted for want of money; yet, as I stated, the best work of an educational character done in our State is being done by the agricultural station at Auburn, and we are conducting in a very much smaller degree an experimental station in each of the Congressional districts of our State. I thought that the Department of Agriculture was established at Washington for the purpose of assisting this very work. That is what I thought the Department of Agriculture was for.

The CHAIRMAN. You people have money enough, the State of Alabama is not a poor State, far from it, and if they were to ask the experimental station for instructions or information they would get them.

Mr. BOWIE. I was not discussing the merits of that particular matter, because I do not know what is the shape of this dairy experiment in South Carolina. I have no personal information on that subject, but I do insist that if we are going to have a Department of Agriculture and to spend \$7,000,000 or \$8,000,000 a year, that the justification for it, if there is any justification, is its educational character, and whenever you give it an educational character you rob it of the objection of paternalism. The recognized exception to the doctrine of paternalism is education and educational work, and the educational work of the Department of Agriculture is the thing which justifies the existence of the Department, in my judgment, more largely than anything else, and if they are engaged in a great educational work down there and a few thousand dollars will help them along, I do not see why that would not be a legitimate function for the Department to perform. I do not know as to the necessity of this particular appropriation, therefore I am speaking generally and not specifically.

The CHAIRMAN. You think it is a legitimate function of the Government to guarantee the individual against loss?

Mr. BOWIE. That is another matter; but I understand that the amount expended for the silo mentioned was \$400, and all the Government did was to give advice as to how it should be done.

The CHAIRMAN. That is partially right; but the Government guaranteed them against loss.

Mr. BOWIE. But it should never cost the Government 5 cents above the salary.

The CHAIRMAN. The principal objection is the guarantee against loss.

Mr. BOWIE. I doubt the binding effect of any such guarantee; it may be moral.

Mr. HAUGEN. Is there anything in connection with the labor of the South that can not be overcome that makes it impossible to encourage or develop the dairy interests of the South?

Mr. LANE. Yes; that is it.

The CHAIRMAN. You think it is the labor question rather than the climate?

Mr. LANE. The labor question is a question which applies all over the country at the present time, but I think more particularly in the South.

Mr. HAUGEN. The labor in the South is entirely different from the labor in the North. The dairy business requires the greatest care and attention, and that kind of labor, as I understand it, can not be procured in the South?

Mr. LANE. They do not know anything about it down there. May I read an outline of this work?

The CHAIRMAN. Certainly.

ORGANIZATION AND WORK OF THE DAIRY DIVISION.

Mr. LANE. A careful analysis of the work possible to the dairy division brings out the following general lines, which are discussed in this report:

First. *Dairy husbandry*.—Taking up the problems of breeding and feeding and the general care and management of herds; the keeping and compiling of herd records by dairy farmers; the handling and care of dairy products on the farm; dairy machinery applicable to the farm, and dairy farm buildings.

Second. *Southern dairying*.—Taking up the problems peculiar to the South; the formation of cooperative relations and stations with farmers throughout the South, tending to give object lessons of what is possible in dairy lines, and a comprehensive study of southern dairy markets.

Third. *The city milk supply*.—This includes a study of the sources of milk for cities; the transportation problems involved, the systems of distribution within the city, pasteurization and other problems entering into the distribution of good milk; municipal laws regulating milk supply; the organization of milk commissions and other societies for the purpose of securing a pure-milk supply; and a study of the various kinds of machinery used in the work of handling and distributing milk in cities.

Fourth. *The manufacture and storage of butter*.—Including a thorough study of the mechanical methods used in the manufacture of butter; a study of the flavors that are developed in the ripening of cream; a study of the storage of butter, taking into account different storage temperatures and their results on butter; the transportation of cream, particularly as it relates to the keeping qualities of butter; and the machinery of manufacture.

Fifth. *Experiments in cheese manufacture and storing.*—Including the mechanical manipulation in making; study of flavors and their causes; experiments in curing cheese at different temperatures and storing cheese at different temperatures; the market problems and commercial handling of cheese, and the machinery used in the manufacture of cheese.

Sixth. *Experiments in the manufacture of European and other foreign cheese.*—Which includes a study of the different types of these cheese; investigations as to the cause of the flavors peculiar to each and the problems involved in practical making of such cheese in this country, and study of markets open for those types of cheese.

Seventh. *Creamery and cheese factory management.*—Which includes a comprehensive study of the systems of organization of factories; the building plans for factories and machinery, and equipment of same; the problems of cold storage in factories; problems of sewage and other sanitary conditions, and the transportation of dairy products.

Eighth. *Inspection of dairy products in markets.*—Including the organization of a system of judging or grading butter and cheese in the market, and unification of methods of judging and scoring dairy products; cooperative efforts with State organizations for the betterment of dairy products; the study of domestic and foreign markets with special reference to the requirements of those markets.

Ninth. *The inspection of renovated butter plants and markets.*—Including the routine inspection and issuing of certificates for expert renovated butter; factory methods and systems, and work tending to improve the general quality of such goods; the enlargement of the field of inspection.

Tenth. *Dairy statistics.*—Including the organization of a system of gathering information on quantities of dairy products produced and manufactured, the quantities of same that go into storehouses to be held for future use, and cooperative effort with the various States tending to bring about the compiling of yearly statistics on the dairy products of the States.

Eleventh. *Dairy products other than butter, cheese, and milk.*—Including condensed milk, evaporated milk, ice cream manufacture, the various milk products used for foods and milk products used in the manufactures and arts, and study of machinery applicable to these purposes of manufacture.

Twelfth. *Classification and indexing of dairy literature.*—Including the organization of a system of through indexing of current literature on dairy questions and the working up of back literature as fast as it is possible to do so. In discussing these various topics this plan is followed: First, the scope of the work which may be undertaken by the Dairy Division, and, second, the work now under way.

(1) *Dairy husbandry.*—When the fact is considered that 50 per cent of the registered stock in dairy herds of our country are practically scrubs, and should be counted as such, it shows that something along the line of breeding of dairy stock should be undertaken. The various live-stock organizations of the country have done some notable work in improving the various breeds, but have not been able to conduct experiments on a broad and comprehensive basis, such as has been done, for instance, in the breeding of plants. It is

altogether probable that the main reason for this lack of a broad and comprehensive work is due to the great expense that would be involved in carrying work of this kind. Through proper cooperative relations with farmers and with State experiment stations it seems that the Department should undertake a work of this nature, which would be of inestimable value to breeders of dairy stock throughout the country. Too little work has been done by the Department along lines of this kind. A study of the adaptability of different breeds to different localities of country should be made.

At the present time there is but little to guide one in selecting a breed for his purposes. The questions of climate, latitude, character of the country, and general food conditions should be taken into account and experiments conducted to show which breeds are best adapted to these varying conditions. One of the great disputed questions in the breeding of dairy cattle is the so-called dual purpose animal. Many well-informed men contend that such an animal is possible, while others equally well informed contend for just the contrary. A line of investigation intended to answer this perplexing question could be well taken up and would be of great value to the farmers, particularly in the beef-producing sections of the country. A question of feeding dairy stock, which should be undertaken, is encouragement of the use of ensilage and other of the coarse feeds to a greater extent than has been done up to the present time. It is admitted that the costly part of a cow's ration is the grain which she consumes. Experiments should be conducted tending to show how much grain can be replaced by coarser feeds and how far these feeds contain the proper food elements for production of milk and maintenance of the animal. Some very valuable work has been done in this line in beef production, and there is no reason why it should not be done in milk production. Feeding experiments should be conducted to determine the limit in amount of concentrated feeds such as cotton-seed meal, gluten feeds, etc., that can be fed without injury to the animal.

In many sections feeds of this nature are cheap and abundant, but the question of quantities which could be fed profitably has not been determined. The effect of feed on the quality of milk produced is an important factor and should be given thorough study. More work should be done along the line of feeding the by-products from distilleries and breweries, to show conclusively whether or not these feeds are injurious or at what stage they become injurious. In many places such feed is abundant and cheap, but because of supposed injurious effects city boards of health have often recommended legislation against its use. Such experiments should determine just to what extent this feed is good and where its use should be stopped by law. The general question of the effect of feed on quality of all dairy products needs considerable experimental evidence to show which are the best adapted for certain lines of dairy work.

The more general question of the care and management of dairy herds is one that would yield good results from thorough investigation. The time or season of the year when animals should be bred, and proper methods of handling breeding stock, problems of shelter, exercise, cleanliness, and things of this nature which have influence on the health of the herd, and on the quality the products produced: the feeding of the young stock, particularly the development of the

young heifer into a good producer, all need more comprehensive work than has been done.

One of the most neglected subjects on the average dairy farm is the keeping of herd records of both quantities of feed eaten by the animals and the quantities of product secured from the same. It is surprising how few men, even breeders of purebred herds, keep accurate records, and yet in this one point is involved greater possibilities in the way of improving herds than in any other one line. A systematic line of work ought to be planned by the Department in various States whereby farmers can be induced to keep records of this nature. Object lessons of this nature would be of great value to the general dairyman.

The average dairy herd barely pays expenses, and yet there are cows in every herd which yield handsome returns. A system of records would show which are the profitable and which the unprofitable animals, and the dairyman would be able to dispose of those which were not yielding profit. In this one line the Department could well afford to put several men in the field, who would have charge of the keeping of such records. Farmers' organizations for this purpose should be encouraged. A system of test associations should be attempted, experimentally at least, for the purpose of improving the production of herds in point of quantity and quality of milk. There should also, in connection with this, be object lessons in the care and handling of milk and cream on the farm. Much has been written in regard to this question. A number of bulletins have been published by the Department, but object lessons in various quarters would do more to improve methods in this respect than all that has been written in the past. Cheap but effective methods of cooling milk and cream could be devised and put in operation and the attention of dairymen in the surrounding neighborhood brought to it.

Investigations should be made in the various lines of farm dairy machinery that are being offered for sale. This is a delicate thing to handle owing to the commercial phase of the question, but if rightly handled could be made the subject of much useful information to the general dairy public.

The Dairy Division is in receipt of many inquiries concerning the construction of dairy barns and other farm buildings for dairy purposes. Endeavor should be made to secure plans and specifications of the best buildings of this nature that have been built. The Dairy Division should be in position to give authentic information as to what has been done and to make comprehensive suggestions in the way of construction of farm buildings related to the dairy side of the farm work.

Work of the past year.—During the past year very little has been done along any of these lines suggested. There have been compiled two bulletins on dairy herd records in which are given great numbers of records of individual animals and of dairy herds for short periods, and in some instances years records of the amount of milk and butter fat produced. All of the various breeds are included, as well as the grade herds. The purpose of these bulletins is to awaken in the minds of the dairymen the possibilities of keeping records and to encourage them to do so more generally than they have in the past.

There is at the present time an investigation being made of the milking machine. This investigation is taken up largely from the sanitary standpoint.

Mr. W. A. Stocking, jr., of Storrs Experiment Station, Connecticut, has been appointed temporarily for this work. The study of the possibilities of clean milk by the use of the machine, the thoroughness of the work of the machine, the immediate effect on the animal produced by the machine, and other problems which can be studied in a short period of time are undertaken. A report of these investigations will be made during the coming year.

As this is practically all the work that the dairy division has attempted under the head of dairy husbandry the past year, it can be very readily seen that there is room for large development in this direction. This is a work that strikes directly home to the producer, and one that has been neglected perhaps more than any other, so far as this division is concerned. The past work of the division along this line has simply been the publication of bulletins telling the dairyman what to do. These were excellent, so far as they go, but in all of this work the most good can not be accomplished unless direct object lessons can be brought to the parties most interested—the farmers.

(2) *Southern dairying.*—The work that the Department of Agriculture has undertaken toward general diversification of farming in the South, has been entered into to a small extent by the dairy division. The South presents many problems in dairying which differ from those in other sections of the country. The climatic conditions are very different, the long hot summers being one of the great drawbacks to the introduction of general dairying. The problems of labor in the South have deterred many from entering into this industry. The general prejudice throughout the South in favor of northern dairy products has made it hard to establish home markets for dairy products. The South is supplied with dairy products almost entirely from the Northern States. The residents of southern cities use condensed milk which is canned in the North; their tables are supplied with butter made in the North; the people who gather at the great winter resorts of the South consume milk and cream produced in the North, and practically all of the cheese consumed in the South comes from the North.

The southern farmer has spent all of his efforts and energy in the production of cotton; has kept only enough live stock on the place to do the necessary work; his soil is devoid of humus; the rolling lands have to be terraced to keep the soil from washing out of the country, and the bills for commercial fertilizers eat up the greater part of the profits from the cotton crop. The great need of all this section is live stock. Without live stock the farms are bound to continue to deteriorate in value, and ultimately many of them will be abandoned. Naturally their first attention in live stock is dairying. There is a growing feeling throughout the whole section that the introduction of general farming must come, and with it means the introduction of dairying.

One of the greatest difficulties in introducing dairying in the South is the lack of knowledge concerning the handling and care of dairy stock and the feeding of same. Without doubt the whole section can produce greater quantities of feed at less cost than any other section

of our country. The southern cotton farmer wants to know how to grow these crops, and he needs information on the question of feeding them to his stock. There is no section of the country where practical working object lessons along these lines are more needed and none where farmers so willingly receive suggestions and aid in lines of this nature. The dairy division should be in a position to cooperate with a large number of farmers throughout the Southern States, practically directing their work, visiting their farms frequently to see that proper methods are used in feeding, breeding, and caring for the dairy stock. Much can be done in the way of encouraging dairying by a systematic study of the markets and an effort to overcome the prejudice there is against dairy articles produced at home. In this work the state experiment stations, and in a few of the States, perhaps, State dairy organizations, can cooperate with the Department.

Work now in progress.—On April 1, 1905, Mr. B. H. Rawl, assistant in animal husbandry and dairying at the Clemson Agricultural College, South Carolina, was appointed as expert in dairying, to study the dairy problems of the South. His work so far has been to travel from point to point, learning what those interested in dairying have accomplished, and studying the field with a view to encouraging others to engage in the work. Wherever Mr. Rawl has gone he has been met by people enthusiastic for knowledge. Several assistants should be given him in this work in the South. There are many farmers anxious for information and guidance from the Department. The success of their efforts will largely depend upon proper instruction, and their success will encourage others to enter the same business.

At Easley, S. C., a number of men have organized a cheese factory, and through the efforts of Mr. Rawl have been induced to build silos. Their work is receiving much attention from other interested dairymen. It is expected to make this one of the objective centers in South Carolina for dairy information. Other similar points should be established in all the States. The gentlemen directly interested in this work are receiving letters from other dairymen in the South, asking if they can come to Easley and study the question as it is being evolved there. This shows the great interest taken in the work, and the necessity of the Department taking a stronger lead and putting men enough in the field to accomplish the results that the southern farmers are looking for.

(3) *The city milk supply.*—One of the live questions of the day is the supply of milk for American cities. This question is, perhaps, receiving more attention at the present time than any other special feature of dairying. City boards of health, city inspectors, and similar officials are striving to secure for the residents of the cities a pure milk supply. Various organizations of consumers, physicians, and of distributors have been formed for this purpose. In the hot weather of summer the high death rate among infants in our cities is supposed to be largely chargeable to impure milk. In the larger cities of the country the problem of the milk supply is a serious one. The whole question is one which seems to be practically neglected by the experiment stations in the various States. This may be so because it appeals more locally to the cities, and the experiment station workers have been giving most of their time and attention

to the producers. Many requests come to the Dairy Division for information concerning legislation on questions of this nature. The Division should be in position to put men in the field to study the sources of the milk supply of the cities, with special reference to the sanitation of barns and premises in order that a pure supply may be secured. The problem is essentially different from that of the producer of milk for butter or cheese factory use, and requires treatment of a different nature.

The problems of transportation are important. The best facilities for transporting milk from the producing centers to the consuming centers should be studied. Principles of refrigeration, proper vessels for containing the milk in transportation, receiving by the railroads, and distribution of the milk are all pertinent questions that need investigation to show what methods are best. In the cities we find that there are several methods of distributing milk. It is common in many of the northern cities to sell the milk at retail from the stores, but the greater bulk of the milk is delivered in wagons direct to the consumer. Some of this is delivered in bottles and some is dipped from the cans as it is distributed. There are many factors in these methods of distribution that ought to be studied from the standpoint of disinterested parties, and the best method determined and advocated. This can be done properly only by having competent men in the Division, who can go to the various cities and study the work at first hand.

The question of pasteurization of the city milk supply is one unsettled at the present time. There are claimants for both sides of the question. When pasteurization is attempted there is a question whether this should be done at the distributing center or at the producing center. Proper temperatures, machinery, and things of this nature should be investigated in this connection and a thorough bacteriological study made of the product. There are now in nearly all of the larger cities concerns producing what is known as certified milk. The methods practiced by these concerns should be carefully studied, and that which is applicable to the general producer should be determined and an effort made to have him adopt the methods which would produce a high grade of milk.

Nearly every municipality has laws regulating the milk supply. Some of these are excellent and some are anything but good. A careful compilation of these should be made with a view to selecting those which work to the best interests of all concerned, and those should be made public in such a way that cities desiring legislation could readily secure information that is reliable.

Some of the interesting developments recently are the milk commissions and organizations of this nature, intended to urge upon the producers methods of thorough cleanliness and sanitation, insuring to the patrons a supply of pure, wholesome milk. These organizations should be studied and encouraged in other places. The Dairy Division should have men in the field competent to handle questions of this nature, who could go from city to city as call might come, giving lectures on the subject of city milk supply. This would tend to educate the consumer to demand a better quality of milk. If it were known that the Department had men who could do this work, many calls would come for aid. In fact, many calls do come, which have to

be passed by because there is no one who can take up this phase of the work and give it his constant attention.

Work of the past year.—On February 17, 1905, there was published a bulletin on the milk supply of 29 Southern cities. This was the result of special investigation made by Mr. C. F. Doane, a special agent of the Division, the previous summer. Newspaper comment on this bulletin seems to show that in many of the southern cities it has awakened a desire for better conditions in regard to their supply of milk. Instances are on record where boards of health are agitating more strict legislation in regard to the milk supply. The immediate effect of this one bulletin will be that many Southern cities will more carefully guard the source of milk that is supplied to them than they ever have before. But this work should be followed up or in a short time the interest that has been shown will have been forgotten.

There has been compiled in the past year, ready for publication, a bulletin on the milk supply of the cities of Philadelphia, New York, and Boston. This bulletin comprehensively sums up the work that is being done in these three cities for a supply of pure milk.

The publication of the one bulletin and gathering material for the other practically completes the work that the Dairy Division has done along the line of city milk supply. There is ample room for a number of men to be constantly employed on work of this nature by the Dairy Division. It is a work that would receive much favorable comment by every consumer of milk in our cities.

(4) *The manufacture and storage of butter.*—The most pertinent questions in relation to the manufacture of butter at the present time are those relating to the control of the amount of water, salt, casein, and fat that the butter contains. Very little seems to have been done in any quarter that gives reliable information concerning these questions. The fact that creamery men are disposed to want to work all the moisture possible in the butter, and that B. A. I. Order 127, containing the regulations of the Department, states butter containing 16 per cent or more of water shall be held to be adulterated butter, makes the question of moisture of particular importance.

The tendency in many sections is to work in more moisture than is allowed under the 16 per cent ruling. Very few butter makers know how to regulate this amount of moisture. This question is one requiring a great deal of experimental work from a practical standpoint. There is no question but what many butter contracts in the future will specify the amount of moisture that is wanted. Butter packed for the Navy at the present time must have less than 13 per cent moisture. There is at the present time a demand for some short method of determining moisture in butter. The chemical methods are of course accurate, but require too much time. Only a few analyses can be made in a given time, and these must be done under laboratory conditions which are not available to the practical maker in the field.

Every year great quantities of butter are put in cold storage and held for winter consumption. It is always a speculation with the storer whether or not this butter will come out of storage in condition to bring the highest market price. One of the peculiar developments in butter thus stored is a fishy flavor, which has caused the loss of

hundreds of thousands of dollars to storage men. Just what this fishy flavor is or what causes it has not yet been determined. There are also many other flavors which develop in butter when put in storage that are undesirable and which should be studied with a view to their correction. It is still undetermined just what temperatures are best for the cold storage of butter. The tendency of late years has been to reduce the temperature more and more until at the present time many storers carry their butter rooms at 5 degrees below zero, Fahrenheit, or as near as they can approach this temperature.

There are many practical questions in regard to storing butter, such as the effect of the amount of moisture in the butter on its keeping quality, the effect of the amount of salt, and the result of the presence of a large quantity of casein in the butter. From the very nature of things, studies of this kind are surrounded by many difficulties. There are so many problems entering into the question and so many possibilities which have to be studied and eliminated that it is a work which will require a long time and the services of the best men obtainable. While much is known as to the cause of fine flavors in the ripening of cream, there are many questions yet along this line that need further careful study. Practically no one knows just the cause of fine flavors or what combinations of flavor are present in the best quality of cream. The questions of pasteurization of cream, the question of the farm separator and its effect on the quality of butter are all pertinent questions which need more light thrown on them than we now have. It is a fact that the introduction of the farm separator has lowered the standard of creamery butter where its use has become general.

The introduction of the separator, on the whole, has been beneficial to the farmer, but if it is going to result in permanently lowering the quality of butter it may after all be a bad thing. If some system of handling the cream and the manufacture of butter can be devised that will make a quality of product equal to what was made from whole milk the advantages that have been gained from the use of the farm separator will not be lost. The centralization of the creamery business into large churning plants, requiring the shipment of cream from long distances, has many problems which have affected the general quality of the goods. Many difficulties in this connection have arisen which have not been solved. Aside from the fact that centralization, from one point of view, may be a bad thing, it seems that it has come to stay and the questions of producing a high grade of butter by this system demands thorough investigation. In these centralization plants there is much need for a better line of machinery for handling the cream and butter. At present these concerns are simply an aggregation of small creameries brought together under one roof, so far as machinery for their use is concerned.

Work of the past year.—On May 1, 1905, Mr. C. E. Gray, chemist and expert for one of the large centralization plants, was employed as an expert in dairying to study the questions outlined above. Mr. Gray's experience as a creameryman has been of such nature that he is particularly well qualified for investigations of this nature. Besides his ability as an expert in butter manufacture, he is an expert chemist and can view all operations of this nature from a chemical standpoint as well as from the practical. There has been asso-

ciated with him Mr. L. A. Rogers, bacteriologist in the dairy division, and the work has been taken up in cooperation with the Iowa Experiment Station at Ames, Iowa. This station furnishes exceptionally good facilities in the way of equipment and in the way of expert assistance for conducting work of this nature. Professor McKay and his assistants will be directly connected with the work, and the State dairy commissioner of Iowa is showing great interest in its development. During the summer Mr. Gray has supervised the packing of various navy contracts in Iowa and Kansas.

In connection with this work he has had opportunity for making some special investigations along the lines referred to, and has placed in storage in Chicago several thousand pounds of butter for experimental purposes. Storage facilities of high excellence have been secured from A. Booth & Co., and their rooms were specially constructed and turned over to the dairy division for their sole use. The particular problems under observation in this butter are, first, the results obtained by different temperatures of storage of butter. It is stored at F. 32° and 10° above zero and F. 10° below zero. In each temperature is placed four lines of butter. A parcel of cream was divided equally, one part of it being pasteurized and the other part churned without pasteurization. Half of each of the lots of butter was salted with a normal amount of salt and the other half with a high percentage of salt. Certain amounts of each lot of butter were packed in 3-pound tins, such as are specified by the navy contract, and the rest are packed in 20 and 30 pound tubs. It is expected to get much useful information from these experiments, particularly along the lines of pasteurization and the effect of salt on the keeping quality of the butter, and the advantages of packing butter in tins hermetically sealed, if such advantages are shown.

During the summer Mr. Rogers has been working among creameries in Wisconsin, where the fishy-flavored butter seemed to be in evidence. The intention of his work is to determine if possible the cause of the fishy flavor. Just what the result of this work will be can not even be predicted. The division greatly hopes that some clue can be found for the cause of fishy-flavor developments.

Mr. Gray and Mr. Rogers will be located at Ames, carrying on the lines of investigation here outlined, and additional work as it may from time to time appear necessary.

(5) *Experiments in cheese manufacture and storage.*—More work has been done in the manufacture of cheese than has been done in the manufacture of butter. Yet there are many points still unsettled that require investigation. At the present time the tendency is to consume cheese when it is but a few days old. Formerly cheese was expected to stand in the curing rooms from six weeks to several months before it was considered fit for consumption.

Investigations made by the dairy division have developed the fact that cheese at the present time is in some instances going on the market less than six days old. The commercial tendency is to constantly force the greener cheese upon the consumer. It requires less capital to handle the business, money is turned more frequently, and profits are correspondingly larger. Thus, whether the consuming public demand it or not, they are gradually being forced to eat a greener

cheese. This being the case, there are several things in connection with the manufacture of cheese which have to do with its early ripening that need more careful study than has been given. The questions of using larger quantities of rennet, of incorporating more moisture in cheese, and making softer curd are all important and have direct bearing on the time when cheese becomes edible. Cheese which is not placed on the market at once is now usually carried in cold storage at temperatures ranging from 34° to 40° and 45° F. The custom of some storehouse men is to take the green cheese direct from the hoop and put it into storage. Others want the cheese cured from one to two weeks in the ordinary cheese-curing rooms at temperatures of 60° to 65° F. before they place it in storage.

There is still need for some study into the question of flavors and their cause in the manufacture of cheese. The problem of pasteurizing milk for cheese-making is in an unsettled condition. It is known that many objectionable flavors in milk can be overcome by pasteurizing, and if it is possible to apply this method to cheese making it may greatly increase the quantity of cheese that can be made and will improve the quality. In various parts of the country there are different types of Cheddar cheese being made. Some of these are of soft quick-curing varieties, while others are quite firm and require considerable time for curing. A study should be made of these various types and the question of digestibility determined. Some systematic effort should be made to encourage a greater use of cheese by the American people. The consumption per capita in this country is less than in almost any other. The reasons for this should be ascertained and a greater consumption encouraged among our people.

Work now in progress.—On May 15, 1905, Mr. C. F. Doane, dairyman and dairy bacteriologist for the Maryland Agricultural College and Experiment Station, was appointed as dairy expert in the dairy division for the purpose of studying the problems in reference to Cheddar cheese making, storage, etc. A cheese factory located in the vicinity of Plymouth, Wis., was selected as the base for experimental work. Storage facilities were secured in Plymouth at temperatures of 34° and 40° F., for storing and curing cheese that is made by him at this factory.

A line of experiments has been outlined as follows: Cheese will be made under normal ordinary conditions, and, with all other conditions remaining the same, with double the quantity of rennet ordinarily used. These two lines will be placed in storage. A portion of this cheese will be kept in the curing room at the factory, where the temperatures will range from 60° to 70° F., and part of it will be placed in storage at 34° and part of it at 40° F. This cheese will be examined from time to time and scored by competent experts for information concerning its flavor and palatability.

A line of cooperation has been started with the Bureau of Chemistry of the Department whereby samples of this cheese will be artificially digested from time to time to determine the changes in digestibility as the cheese gets age. Connected with these digesting experiments will be a complete chemical analysis of the cheese. It is also planned to take up later in the season—probably in September, 1905—a line of experiments on this cheese with human subjects. This work will be under the direct charge of the office of experiment

stations in their work on human nutrition at Middletown, Conn. It is also probable that considerable work will be done by these parties in connection with the calorimeter. It is hoped that the result of these experiments will show conclusively at what point in the stage of ripening the cheese is best fitted for human food, and whether or not the addition of an abnormal quantity of rennet will affect the length of time it takes to become fit for human food. It is also expected to determine whether there is actually any difference between storing at temperatures of 34° and 40° F. There is work enough in this field for an additional man to assist Mr. Doane and to carry the work on indefinitely.

(6) *Experiments in manufacture of European varieties of cheese.*—The great bulk of cheese consumed by the American people is of the Cheddar and Swiss varieties. In certain localities considerable Limburger cheese is manufactured and used. There are manufactured in Europe a number of varieties of cheese with which the average American is entirely unfamiliar. They have been introduced to a slight extent, mostly importations from the old country by emigrants who have brought their taste for these peculiar varieties of cheese with them from abroad. It has been commonly supposed that most of these varieties of cheese could not be successfully made outside of certain districts in the Old World, where they have been manufactured for generations. Doubtless the makers in these localities have done all they could to discourage any experimental work in manufacture outside of their own country. Americans traveling abroad have acquired the taste for many of these varieties, and on their return home have attempted to find them on their local markets.

The methods of manufacturing and the fact that most of them can be made with very little machinery make the adoption in certain parts of our country of this line of manufacture a desirable thing, if proper instruction can be given to dairymen in the art of making. With this thought in view Professor Clinton, director of the Storrs Experiment Station, about two years ago began an investigation, expecting to be able to introduce to the dairymen of Connecticut a business in manufacturing these varieties of cheese. Many difficulties in the way of successfully making were found. Director Clinton finally called on the Department for assistance, and three men have been furnished to work under his direction entirely on the problems involved in manufacturing these foreign varieties.

Work now in progress.—During the year just completed most of the time of these experimenters was given to the Camembert type of cheese. The difficulties surrounding the manufacture of this cheese have been practically overcome. One bulletin has been published which details many of these difficulties, and shows that it is possible to manufacture a cheese of this type in the United States. Another bulletin is in course of preparation which will give detailed instructions for the manufacture of Camembert cheese. This work has created considerable interest in many quarters, and numerous inquiries have been received by Professor Clinton for instruction in the making of this and other fancy types. It is altogether probable that a course of instruction for this work will be offered by the Storrs College, although this has not been definitely settled upon at the present time.

The men in charge of this work are at present working on the Roquefort type, and will continue with this until complete information has been obtained regarding the details of its manufacture and the difficulties that are in the way of the average maker embarking in this line of cheese making. It has been proved beyond doubt that as good cheese of these types can be made in our country as are made abroad.

(7) *Creamery and cheese factory management.*—Ever since the introduction of the factory system of manufacturing butter and cheese, there has been a constant agitation in the minds of producers as to the kind of an organization to form for the manufacture of their products. It seems to have been early conceived that this was a fruitful field for cooperative efforts, and many cooperative factories for the manufacture of butter and cheese have been established in the various States. This is notably true of the State of Minnesota, where the greater per cent of creameries are cooperative organizations, managed and controlled by the patrons who deliver milk to the creamery.

At the same time there have been hundreds of organizations of this kind started which have been failures. A more or less careful study into the cause of some of these failures reveals the fact that the greatest difficulty seems to be lack of proper information in cooperation. The parties interested do not understand the principles of cooperation, and do not understand how to form an organization that would be effective for the purposes intended. Among the proprietary concerns manufacturing butter and cheese there have also been many failures. There is probably no business in which so many details enter into the work as in the management of a butter or cheese factory. These difficulties are often obscure, and the ordinary observer does not know where losses occur, and very many failures that have occurred, while attributed to bad management, could have been avoided had the managers had thorough knowledge of all the details of their business. It is not enough to say that they lack business capacity, for the obscure details in connection with their business were of such nature that it was not within their power to know wherein the difficulties lay. The present tendency, particularly in western parts of the country, is toward the centralization of the creamery business.

Producers look upon this with considerable misgiving, and question whether or not the results that have been common to some other lines of business where centralization has affected it will not eventually come to them, and they will be forced to take a less profit than formerly, and eventually be forced out of the business. Taking into consideration all of these facts in regard to the management of the manufacturing end of dairying, it would seem that a profitable line of investigation could be started by the dairy division looking toward the giving of accurate and definite information to parties desiring such in the management of cooperative and proprietary concerns. The failure of a concern of this kind affects more people than would the failure of a store or other mercantile business. It usually gives dairying a backset which takes years to overcome, and much profit is lost to the producers by not being able to appreciate the advantages in dairying when properly organized.

There is need for some persistent and urgent effort to induce machinery manufacturers to construct their machines along lines

that can be more easily kept in sanitary condition. Much of the machinery now used is, from a sanitary standpoint, poorly constructed. The makers seem not to realize the great importance of construction that would make the machinery easy to clean and easy to keep clean. In this connection investigations should be made for the benefit of cooperative and small proprietary concerns as to the necessary kind of equipment to use in small manufacturing plants. Men who embark in this business often know nothing at all of the mechanical phases of the equipment and they are likely to run into error because of this. They usually have to accept the recommendation of manufacturers, and too often these recommendations are made from the standpoint of putting in all the equipment possible, whether needed or not.

In the southern sections of the country nearly all factories of this kind have to be equipped with artificial cold storage. The problems in connection with this are not always altogether clear to builders of small plants. The dairy division should be able to give accurate information concerning such equipment. One of the important things, from a sanitary standpoint, in the construction of dairy buildings is drainage. Too often buildings are placed in such location that a direct outlet for the sewerage can not be obtained, and systems of settling beds have been devised. These should be carefully studied and their use adapted to the small dairy and creamery plant.

An important problem in creamery management at the present time is the transportation of cream and milk to the creamery or cheese factory, and the transportation of the manufactured products. Particularly is this true in localities where the centralizing system has been adopted. A systematic line of experiments should be entered into showing what facilities are needed in the way of transporting cream long distances to the churning point. Both the manufacturers and the railroads would welcome a thorough and systematic investigation of this question. The shipment of dairy products into hot climates, which is frequently attempted by creameries, has many points which render such shipments at times unprofitable. There are problems in this connection the study of which could well be undertaken by the Dairy Division.

Work in the past year.—Practically nothing has been done by the Dairy Division other than answering correspondence from the meager knowledge at hand on the above questions.

(8) *Inspection of dairy products in the markets.*—In the scoring of dairy products, particularly butter and cheese, on the markets, there is a great difference of opinion. Practically every market has its own standards. While a common score card is used for judging butter and cheese, the interpretation of this card depends entirely upon the local conditions and local judges. Butter that scores at a certain point in one market might not be considered as good in another. This is an unfortunate condition, because of the fact that makers of butter and cheese usually want to find the market which will pay the most for their goods, and sometimes change of markets means a change of method or system in their work, and it entails uncertainty as to what their goods will bring. If some system were devised whereby the official judges of the various markets could get

together in some way and bring their scorings to the same basis it would greatly help matters in this respect.

The various States producing large quantities of dairy products have, within the last year or two, established systems of scoring within their territory, which tends to educate the butter makers and cheese makers to better methods of manufacture. From 60 to 75 per cent of the butter that goes to the great markets will not score as extras, which means that it is not a good quality of butter. The attempt has been made by State dairy officials and the officers of dairy schools to have the makers once a month send tubs of their butter to a common point for scoring and criticism. This undoubtedly has resulted in much good to the makers who have entered into such tests, but, unfortunately, but a small per cent of the makers avail themselves of this opportunity for education. Another point which makes tests of this kind somewhat impracticable, so far as improving the general make of butter, is that the maker will take extra pains with the tub he is going to send to the test, consequently it does not accurately represent his general make of butter.

In the larger markets of this country the organizations of commission merchants and butter dealers have appointed official inspectors to score butter when called for by dealers. This is done in order to sell the butter on its merits, so far as this is practicable under present conditions of marketing, but it does not do much good so far as the maker is concerned, as these reports rarely ever go to him, and if they do there is not sufficient data as to the faults of the butter to enable him to overcome them. Considerable inquiry among butter dealers and officials of State dairy organizations, dairy schools, and State dairy commissioners has led to the belief that the Department, through the dairy division here, has a great field for operation. Competent men could be placed in the larger markets to score the poorer grades of butter as they come into the market and report back to the creameries making this butter, either directly or through the State dairy commissioners, or the officers of the State dairy schools.

It is believed that very much good could be done in this way toward improving the general quality of the butter made. If a creamery continued to send a line of poor goods to market, an expert from the State or possibly from the Department could be sent to this factory and his case made the subject of thorough study, and instruction given which would enable him to make good instead of bad butter. The same possibilities are open in the cheese business, perhaps to a less extent, however, than in the butter business. There is no questioning the fact that a great improvement could be made in the general quality of butter and cheese coming to the market if a systematic system of market scoring was adopted and this was followed up by proper instruction at the factories producing poor goods.

In connection with this inspection of dairy markets at home, something should be done toward studying conditions in foreign countries. While at the present time our own people are consuming practically all of the butter manufactured in this country, there are times of the year, and there are certain years, when a good outlet in foreign markets would be of great advantage to producers and dealers. Attempts have been made by the dairy division in the past to export butter to England, and to a limited extent to other countries. No very definite knowledge has ever been gained from this work, or knowledge which

has been practicable to exporters. There is no doubt but a thorough study of conditions in the various foreign countries, where butter and cheese would be apt to find a market, with a view to giving our makers at home instructions for packing goods for these markets would be advantageous. The requirements of these markets are not understood by American makers, and consequently goods can not be made which will fill the bill when sent out of the country.

Work of the past year.—Practically nothing along this line has been attempted the past year by the Dairy Division.

(9) *Inspection of renovated butter plants and markets.*—Since July 1, 1902, it has been the duty of the Dairy Division to inspect the renovated butter plants of the country, and more or less thorough inspection has been made of the markets and of market conditions in handling renovated butter. This duty was imposed by Congress and by the rules and regulations of the Department of Agriculture. The officers of the Dairy Division have been instructed to make thorough sanitary inspection of plants, inspection as to the marketing and packing of the goods, and the inspection of export renovated butter. Little difficulty has been encountered with manufacturers of renovated butter respecting the laws and regulations as prescribed by the Secretary of Agriculture. Quite a different story is true of the dealers selling renovated butter.

Many of them have contended that they have a right to remove all marks from such goods and sell them for whatever they please. Adverse decisions in at least two courts helped them in this opinion. A recent decision, however, in the United States district court of southern New York has sustained in every particular the rules and regulations as prescribed in Bureau of Animal Industry Order No. 127. But as the court was on the same plane as the courts that made previous decisions it only partially sustains the points held by the officers of the Department. The defendants in this particular case have, however, appealed to a higher court, and it is confidently expected that a decision from this higher court will be given during the coming fall. If this decision sustains that of the lower court there will be no further question as to the standing of the Department in enforcing rules and regulations already prescribed.

There could be profitably taken up in the renovated-butter business some lines of experiment which would tend to improve the general quality of products. In fact, the inspectors as they have visited the different factories have been able to point out many things to makers which have to a great extent improved the general quality of the goods manufactured at the present time. The demand for all grades of butter the past year has been so great that practically all of the packing stock available in the country has been used by the manufacturers of renovated butter. This call for stock keeps it used up close to the market. Consequently there is at the present time very little old stock being used by manufacturers. There is, of course, during the flush season much stock put away in storehouses which is drawn upon during the winter months for purposes of manufacture. The scarcity of stock for this purpose the past year, particularly during the early spring months, put many makers out of the business for the time being. Just what the condition will be the coming year, of course, can not be predicted in this respect.

Work the past year.—Regular inspections have been made by the inspectors appointed for this purpose of the various renovated butter plants of the country. Reports of each inspection are on file in the office of the Dairy Division and they show that the tendency among makers is to conform with the rules and regulations of the Department and to use every means to improve the quality of their goods. Very few violations of the rules have been reported by the inspectors, so far as manufacturers are concerned.

The total amount of renovated butter made during the past twelve months, as compared with the previous twelve months, is as follows: Twelve months ended June 30, 1905, 60,164,783 pounds; twelve months ended June 30, 1904, 54,171,183 pounds.

Two of the regular inspectors made trips through the Southern States during the winter, and their reports show that the greater majority of dealers in that section handling renovated butter complied strictly with the law and with the regulations. Reports of inspectors on dealers in the Eastern States are not so flattering in this respect. There has been in some quarters a systematic effort to violate all regulations. It is hoped that the court decision above alluded to will be sustained by the higher courts, when this matter can be taken in hand and such violations stopped. There is no question but that renovated butter is as legitimate an article of food as any other form of butter. It is not the policy of the Department to try to destroy the manufacture of or the markets for renovated butter, but so long as laws enforcing certain regulations are on the statute books it becomes the duty of the Department to see that these laws are enforced. In doing this the officers of the Department necessarily run counter to the interests of many retailers, who desire to defraud the public by retailing one kind of goods for another.

It is evident that the intent and purpose of the renovated-butter law was to protect the consumer against fraud in this respect. It would be to the consumer's interest, when he is wishing to buy a cheap grade of butter, to demand information as to whether or not the butter given him is renovated or of some other character, as the consumer could rest assured that butter bearing the renovated stamp was made under sanitary conditions under the surveillance of Government officials, and that goods deleterious to health were prohibited from being used in its manufacture.

(10) *Dairy statistics.*—Requests frequently come to the dairy division for information concerning the quantities of dairy products manufactured in the country, or in certain localities of the country; the quantities of such goods that are put in storage for future consumption; the quantities of such goods exported to foreign countries, and the quantities that may be imported from foreign countries to our own. But very little information can be given to questions of this nature. Some system or systems for gathering information of this kind should be inaugurated. An example of the need for information of this kind is given in the speculation that has been made for the causes of high prices of dairy products of the past winter.

All kinds of reasons have been assigned for the extremely high prices that have been maintained, particularly for butter. Some made the claim that it was a shortage of production, others that it was the result of the workings of the oleomargarine law, and still others that the amount of products consumed was increasing faster than the

increase in production, and others had an idea that it was the working of some organization or trust controlling prices, and so on. Accurate information is not obtainable at the present time as to just why prices should have been so high. It is known that all of the butter made was consumed, but whether or not there was less butter made or the consumption had suddenly increased is not known, as no concerted effort has been made to gather statistics that would give this information. During the storage season many buyers of butter who would put butter into storage are at a loss to know whether or not the make at the particular time compares with that of previous years.

There are no statistics that give information concerning this that would be a basis for them to use their judgment in storing goods for future use. This often has a bad effect on prices, tending to make them lower than they should be at such times. As the storers of butter are bound to be on the safe side if possible, they have forced the price as low as the market would stand. In some States authorities have, through their department of agriculture, devised systems of yearly census as to the total cows in the State, or total amount of butter and cheese made, and so on. It is altogether probable that other States would adopt measures of this kind if they could see the benefits derived from the gathering of such statistics.

Work of the past year.—Practically nothing has been done along these lines the past year, although in years past statistics have been published based on the Eleventh and Twelfth censuses, and there has been enough calls for these publications to justify a systematic effort by the division in gathering this information yearly, or as much of it as it is possible to gather yearly.

(11) *Dairy products other than butter, cheese, and milk.*—Arguments that have been applied to the manufacture of butter and cheese apply equally well to the manufacture of other dairy products. The Dairy Division should be in a position to carry on investigations in these manufactures. The question of the manufacture of condensed and evaporated milk is one of great importance to the country, and there is room for considerable profitable work to be done investigating methods of manufacture of these products. The manufacture of ice cream is in itself a great industry. Too little experimental knowledge is in evidence on this subject. Great quantities of the ice cream made and consumed in the country are practically unfit for consumption. The questions involved in the manufacture of ice cream are of sufficient importance to engage the attention of the Department through the Dairy Division.

The manufacture of by-products of milk into food products is of great importance. Many States regulate to some extent the manufacture of skim-milk cheese. There should be a number of experiments carried on in the manufacture of this kind of cheese in order to determine methods of producing better quality than is now made, and to determine if a cheese of this character should not be placed on the market, so that those who are forced to buy cheap products could buy a wholesome cheese of this nature which would serve their purpose.

The casein of milk enters into the manufacture of numberless food products, and investigations should be made into the methods and kinds of such manufacture. The manufacture of milk products that enter into the manufactures and arts is an important subject. Many creameries and cheese factories are looking for outlets for their skim

milk and whey. The profitable working up of these means the saving of many dollars to these concerns. While many of the processes in manufacturing products of this kind are patented, yet there is plenty of room for experiment intended to increase the amount of such products now used and to increase the field in which their use is applicable.

Work of the past year.—Practically nothing has been done along these lines during the past year by the Dairy Division.

(12) *Indexing and classifying dairy literature.*—There is at the present time no comprehensive index of dairy literature in this country. If one wishes to obtain information on any dairy topic he is forced to wade through numberless publications and books in order to find what is wanted. All of this great mass of literature should be properly indexed and classified in such a way that any desired topic on dairying can be quickly studied, and all the information available at the present time brought at once to the attention of the investigator. The work of classifying current literature and taking up that which has been published in the past is a work of considerable magnitude.

There is one party at present working independently on a classification of this kind. He has spent months upon it, and has not yet come within ten years of current literature in the work. This individual is desirous of completing the work, and is perfectly capable of making a satisfactory classification as outlined above. The Dairy Division should be in a position to employ a man of this kind who could take up the work and complete it under the charge of the Department.

Recommendations for the year 1905-6.—For the coming fiscal year I recommend that the work of the dairy division continue as it is organized at the close of the present year, so far as general lines of work are concerned. There should be added, if possible, an extra man to assist Mr. Rawl in the southern dairy work. This matter has been under advisement and such action decided upon, provided the funds of the Bureau are sufficient to employ the extra man. The work for all of the men now in the division is well organized and they have their plans for the year outlined. The extent of this work and its organization is given in previous pages.

Recommendations for the year 1906-7.—Steps should be taken during the coming session of Congress to secure appropriations ample enough to organize the various lines of work outlined in this report by the 1st of July, 1906. A careful estimate of the amount of funds necessary to complete such organization has been made, and the amount needed can not be less than \$100,000. This sum will in no wise do justice to the various lines of work outlined, but will give funds for the appointment of an expert for each special line outlined and assistants which may be necessary for the first year of the work.

In regard to the method of handling the work in the various sections mentioned the following general outline is given:

The dairy husbandry work, so far as the breeding and feeding investigations are concerned, could be well taken up in connection or in cooperation with the animal husbandman of the Bureau; for purposes of administration, funds, and for systematizing the work this would probably be a better arrangement. The rest of the work outlined under this section would be directly under the charge of the

officers of the dairy division. A man who is thoroughly familiar with the keeping of herd records and who has studied this question from a practical standpoint should be secured to take charge of this part of the work. Under his management could also be placed the handling and care of dairy products on the farm. What the possibilities are for growth in this line of work can not be estimated, there being practically no limit to its expansion. But there should be provided, before the end of the year, at least four or five assistants, in order to make a thorough test of its possibilities.

There should also be appointed for the dairy husbandry work a man competent to handle the questions of dairy machinery and dairy farm buildings. This is a question of enough importance to occupy his entire attention.

In section 2, southern dairying, provision should be made for at least five or six assistants. This work is far-reaching in its nature and requires very close attention to the operations that are undertaken, and one man can not cover too large a field. The extent of the problem has already been shown in the work undertaken by Mr. Rawl, who now has this work in charge.

In section 3, city milk supply, there should be provision made for the appointment of two men; one who is a thorough and competent bacteriologist and has had experience in the production of sanitary milk, and the other a man who can go before the public as a lecturer, giving lectures on the question of city milk supply. The man who fills the position of lecturer could gather all the necessary information in regard to State laws and organizations such as milk commissions, etc. It is probable that much of the laboratory work in connection with this work could be taken up in cooperation with some experiment station in a manner similar to the work now organized in the experiments with butter. This would relieve the Department of considerable expense and would serve a good purpose in bringing the station workers into line with our ideas and work.

In the fourth section, manufacture and storage of butter, it is not likely that more than one assistant to the man already in the field will be needed, as that would place the work on a very substantial footing and fulfill all the requirements in the case.

In the fifth section, experiments in cheese manufacture and storing, provision should be made for an assistant to the man at present in charge. This assistant should be either a chemist or a bacteriologist. It would be preferable to have a man competent to handle each side of this question. There is a possibility of doing some of this work in connection with some experiment station and saving some of the expense that would be attached thereto.

In the sixth section the experiments in the manufacture of European and other foreign cheese need no enlargement over the present arrangement.

In the seventh section, creamery and cheese factory management, for the proper conducting of this work there should be at least two men employed—one who is an expert in the organization of creameries and cheese factories and their operation, and one who is an expert in the problems of cold storage of dairy products.

In section 8, inspection of dairy products in the markets, there is hardly a limit to the possibilities of work that can be done. This

work would require the appointment of a man who is an expert in the judging of butter and the employment of another who is thoroughly posted on details of manufacture of butter. These two men should work in cooperation, and in order to place the matter on a footing that would be of practical value a considerable number of assistants would have to be appointed, who would work under the direction of these directors, all of them being experts in the judging of butter.

The question of cheese might be carried over for another year before its organization is attempted.

This section also needs the constant services of a man who can study the foreign markets and their requirements and place this matter in such form that American makers can use the information obtained.

Section 9, inspection of renovated-butter plants and markets, is practically well organized at the present time and unless new developments occur will not need additional help. It may become necessary to do more market inspecting. In this case it is possible that three or four additional men will be needed for the purpose.

Section 10, dairy statistics, would require the services of one expert statistician. It might be deemed better policy, from administrative standpoints, to have work of this nature taken up under the Bureau of Statistics, but in that case it ought to have some direct connection with the Dairy Division in order that the statistics required and needed might be collected and that they be collected from the standpoint of advancing the interests of dairying. It would be much preferable to have work of this kind conducted by the Division.

For section 11, dairy products other than butter, cheese and milk, the appointment of one man would be sufficient for the first year of the organization of this work.

Section 12, classification and indexing of dairy literature, would require the services of but one man, provided the right party could be secured.

It will be seen from this that when these lines of work are inaugurated it will require considerable increase in the office force in the way of stenographers and clerks. Just what the amount of this additional help would be can not be determined until after the organization of the work.

The above estimate calls for at least 12 men, for whom a salary of from \$1,500 to \$1,800 would have to be paid, and of at least 20 men whose services could be secured for from \$720 to \$1,200, aside from the additional office force. This would make a salary roll of from \$35,000 to \$40,000 in addition to what the Dairy Division now has. As the greater part of the assistants needed for this work would not have to travel to any extent, it is barely possible that this work could be organized on the basis outlined at a cost of not to exceed \$100,000. As it would not be possible to have the organization complete and under way by the 1st of July, 1906, it would take several months before many assistants would need to be employed. It can be seen that \$100,000 would cover the necessary expenses for that year, but the plan would involve appropriation for at least \$150,000 the next fiscal year.

Mr. HENRY. Is it your opinion as a practical dairyman that you can produce a high grade of butter without ice and without cold spring water?

Mr. LANE. They are producing a high grade of butter down there, which they are selling at Atlanta at a contract price of 30 cents a pound. That is high-class butter.

Mr. HENRY. Atlanta is some 800 feet above the sea, but I referred especially to where there is no ice and no cold water.

Mr. LANE. They can produce a high-class butter there.

Mr. HENRY. Do you, as a practical dairyman, believe that you can produce a high-grade butter without ice?

Mr. LANE. I believe they could.

Mr. HENRY. I do not think so.

The CHAIRMAN. How would they keep the butter up—keep it from melting?

Mr. BOWIE. There are factories in the South.

The CHAIRMAN. But I mean on the farms. It looks to me a little like you are trying to introduce an industry and get a large number of people in and then have a failure, as they did in the tobacco business in Connecticut.

Mr. HENRY. There has been no failure in the tobacco business in Connecticut.

Mr. LANE. How cold water do you refer to?

Mr. HENRY. Water at least 50 degrees.

Mr. BOWIE. Does the gentleman think we have no springs in the South?

Mr. HENRY. I do not believe you can produce good butter in a semi-tropical climate, any more than you can grow cotton in New York and New England, which, however, may be done in hothouses.

Mr. BROOKS. Do they not have artificial ice plants?

Mr. BOWIE. Yes; and nearly all the farms have springs too.

Mr. BROOKS. The defense for this appropriation, as I understand it, is that by spending a few thousand dollars on this work annually where they have not hitherto devoted themselves you can reach a successful realization through a number of years and incidentally save a large amount of loss of time and money to the people engaged in it?

Mr. LANE. Yes, sir.

Mr. ADAMS. I would like to state that in the Southern States, most of them, the temperature does not reach any higher points in the summer, not any higher and probably not so high, as in Wisconsin and Minnesota, and we produce butter of the very finest quality during the hottest season of the year. And further, the development of this artificial manufacture of ice is going on all the time and is being cheapened, and ultimately it will be probably true that you can get ice just as cheaply as they can take it from the northern lakes and put it in ice houses.

The CHAIRMAN. I think the creamery is a possibility, but I do not think the making of butter on a farm is a practical thing. There you can not have a large enough ice plant and all the necessary fixtures to make good butter. You can not make good butter in the Southern States without putting in ice, and I do not believe you can educate the farmer to make good butter.

Mr. LORIMER. We all seem to labor under the idea that they have such hot weather in the South that you can not raise butter or keep it after you have raised it. The facts are that in many portions of the South the nights average a great deal colder than in the North in summer time. I have traveled a great deal through the South

and I find the spring water down there just as cool as the lake water is out in my own neighborhood, i. e., the spring water that we have in the neighborhood in which I live. The ice, of course, is a drawback there; but our farms do not have ice and they are still making butter.

The CHAIRMAN. They make it, but it is not a high-grade butter.

Is there any further information desired in regard to the dairy interest of the South?

Mr. FIELD. I suppose this matter will come up for further discussion?

The CHAIRMAN. Yes, sir; this is all informal and for the sake of information. The appropriation for this dairy instruction is carried and included in the main appropriation. We never have made a specific appropriation for it, but the Department divides up the lump sum appropriation as it pleases for the different objects. Doctor Melvin, we may as well go now to your main item of appropriation, which is \$1,729,000, an increase of \$272,480.

Mr. BOWIE. I notice that an estimate is submitted for experimental work in cooperation with the State authorities for the eradication of ticks.

The CHAIRMAN. We will take that up a little later.

Mr. BOWIE. Mr. Clayton has some documents and papers that he wanted to submit, and he came here for the purpose of showing them to us, but he had to go away, and I would like the committee to extend him the privilege of making a statement at a later time on that point.

The CHAIRMAN. Certainly.

Just tell us, Doctor Melvin, in a brief way, the causes for the increase you ask for.

Doctor MELVIN. About the expenditure of the total \$1,729,000?

The CHAIRMAN. Yes, sir; your main appropriation—the lump-sum appropriation. You are asking an increase of about \$275,000, in round figures, over last year. Please state specifically what are the reasons for that increase.

Doctor MELVIN. For the year ending June 30, 1905, we had in the regular appropriation bill \$1,250,000—that is, in the previous year ending June 30, 1905. And in addition to that there was a deficiency bill.

The CHAIRMAN. You have for the year expiring June 30, 1906. \$1,456,000?

Doctor MELVIN. One million four hundred and thirty-one thousand five hundred and twenty dollars. That is without the appropriation for breeding experiments.

The CHAIRMAN. The increase, according to my figures, over the current fiscal year is \$272,480—that is over the fiscal year ending June 30, 1906. Your estimate for the fiscal year commencing July 1, 1906, amounts to \$272,480 more than the appropriation for this present fiscal year?

Mr. SCOTT. And of that increase, as I figure the appropriation here, \$274,480 is due to the increase asked for to carry out the inspection laws?

The CHAIRMAN. And \$25,000 for eradicating the ticks.

Doctor MELVIN. That is it; that is it exactly.

Mr. BOWIE. The increase then is simply in the two items of inspection and ticks.

Mr. SCOTT. Those are the two items—inspection and ticks.

The CHAIRMAN. Then the matter calls for an explanation as to why such an increase?

Doctor MELVIN. We have estimated as our expenditures for the present year \$1,581,000, and that is exclusive of the animal breeding and feeding, and to complete that work and provide for some additional microscopical inspections, we have asked for an additional appropriation of \$135,000. We are calculating, in making our estimate for next year, on receiving that additional appropriation for this year. Considering our expenditures for this year on the basis of \$1,581,000, there is an increase of \$28,000 for microscopical inspections, \$50,000 for the eradication of sheep scab and cattle scab, and \$20,000 additional for our dairy division, making \$98,000, and then in the increase is \$25,000 for tick eradication, and including the animal breeding and feeding appropriation of \$25,000, which we have again asked for, brings the total to \$1,729,000.

The CHAIRMAN. Your first item is \$78,000 for increase of inspection?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. What has caused that demand for inspection?

Doctor MELVIN. Twenty-eight thousand dollars of that is for microscopic inspection of pork.

The CHAIRMAN. And \$50,000 is for what?

Doctor MELVIN. Sheep and cattle scab eradication.

The CHAIRMAN. Why the increased demand for mange and scab eradication? You have a liberal appropriation for that purpose now.

Doctor MELVIN. The various States in their work of eradication of this disease of sheep and cattle scab have requested the assistance of the Department, and it has been impossible for us to extend to them the assistance which they ought to have to inaugurate effective measures. The Bureau has never been, I think, in sufficient condition, as regards its appropriation, to effectually take up this cattle scab, and the result has been that we have been unable to supply the number of inspectors necessary to make the inspections of interstate shipments and of shipments within the State in cooperation with the officials. This cattle-mange eradication was forced upon the Bureau by the demand of shippers who were constantly hampered by State officials in exacting local fees where stock passes from one State into another, and it was detrimental to the trade, and not only expensive to the shipper, but caused him much inconvenience and frequently loss.

The CHAIRMAN. That was all cured by the law we passed last year?

Doctor MELVIN. Yes, sir. We have to make these inspections.

The CHAIRMAN. That was all cured by the law of March 3, 1905. You did not have the power until we passed the law of March 3, 1905?

Doctor MELVIN. Not absolutely.

The CHAIRMAN. You had exercised the power, but really without any authority. so I understand, and then we passed a law, and now you have the direct law?

Doctor MELVIN. That was the last law, but there was a law enacted in 1903 which was thought would extend to the Department sufficient authority, but it did not.

The CHAIRMAN. You had some test cases?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. You had some test cases in the West?

Doctor MELVIN. Yes, sir.

Mr. ADAMS. I would like to ask if any inspection work is done outside of meats designed for export?

Doctor MELVIN. Yes, sir; probably the greater portion of the meat-inspection item is expended for meats slaughtered for interstate and local consumption.

Mr. ADAMS. What proportion of this appropriation is used for domestic consumption?

Doctor MELVIN. We have never undertaken to ascertain. The fact is that these meats are not separated for the different trades that they will eventually enter into until after the slaughter of the animals. It is impossible at the time of the slaughter of the animals to determine whether they are for local or interstate or export consumption; consequently the Department exercises the right to inspect all cattle at the abattoir.

Mr. ADAMS. How far does the Government exercise the right, through your Bureau, and to what extent does your inspection go, as relates to all the animals slaughtered at the great slaughtering centers of the country? Do you inspect them all?

Doctor MELVIN. At all of the principal establishments.

Mr. ADAMS. All of the great packing centers of the country?

Doctor MELVIN. Yes, sir; and many others.

The CHAIRMAN. Now, Doctor Melvin, please continue your statement.

Doctor MELVIN. I will give you an instance of one case where we were unable to extend cooperation, and that was last year in New Mexico. They have been doing some work there—the State has, and the Department with them—and it was in splendid shape for cooperation. It requires from one to two years to get the stock owners educated to the point where they can and will cooperate with the authorities. The year previous had been a very favorable grass year in New Mexico and sheep were in good condition and the officials there desired us to enter into cooperation with them and supply from 35 to 40 men in the work of scab eradication.

The CHAIRMAN. For scab eradication in sheep?

Doctor MELVIN. Yes, sir. On account of the lack of funds we were unable to place but ten men in there, and in consequence the work was not as thoroughly done as if we had been able to give them all the assistance necessary. Therefore it will have to be continued this year, if we receive a sufficient appropriation.

The CHAIRMAN. Are they doing anything to help themselves?

Dr. MELVIN. As far as possible. They are provided with, I think, four paid inspectors. Their inspectors are paid by fees collected from the stock owners, but the fact of the matter is that the inspectors of the Department are so much more reliable that their work is equivalent to the work of several local inspectors. In fact, not much dependence can be placed in the work of those local inspectors, generally speaking.

The CHAIRMAN. Why is that?

Dr. MELVIN. They lack the information.

The CHAIRMAN. Lack the educational requirements?

Dr. MELVIN. Lack the education, and to the fact that they are subject to the influence of local politicians and others in the State or in the district, and they do not and can not enforce the regulations as they should be enforced.

Mr. COCKS. What do these men do—do they examine the herds on the range?

Dr. MELVIN. Yes, sir. They go out on the range and certain districts are assigned them and they make the inspections in that district. Wherever there is stock which has roamed over infected ranges they are required to dip once, and if there is any disease within the herd they are required to dip twice; and these men in preparing these dips see that they are properly prepared and that the animals are properly dipped and ket in for the certain required time, and they determine whether they should be dipped once or twice, as the case may be.

The CHAIRMAN. Have they the power to force an owner to dip?

Dr. MELVIN. No; only through quarantine. Our inspectors, as a rule, are commissioned by the local authorities so as to give them power within the State and it is through the quarantine measures that the dipping is forced on the owners who refuse to dip. In Wyoming, that State has authority to designate a quarantine district and to place a man in charge of this quarantine. He is paid a per diem salary and expenses and the sheep are a lien for those expenses.

Mr. HAUGEN. What dip does the Department recommend for sheep?

Doctor MELVIN. The Department has recommended two—the preparations made from lime and sulphur and from tobacco and sulphur.

Mr. HAUGEN. Have you the proportions here?

Doctor MELVIN. Yes, sir. The requirements of the Department are that the lime and the sulphur dips, when diluted ready for use, shall contain not less than 2 per cent of lime nor more than 1 per cent of sulphur combined in the form of calcium sulphide. The other is 2 per cent of sulphur and five one-hundredths of 1 per cent of nicotine.

Mr. HAUGEN. How often do you recommend dipping sheep?

Doctor MELVIN. Only when they have been exposed to disease or are infected with disease. Where they are exposed, one dip is required, and where diseased, two dips are required.

Mr. HAUGEN. In a large herd where the scab is not known, is it necessary to dip? I understood it was. You dip on account of tick, too?

Doctor MELVIN. In some of these States, in order to make a thorough and complete job of the eradication, the sanitary board has passed an order requiring all sheep or cattle in or within certain bounded districts to be dipped. Those not showing evidence of the disease to be dipped once, and those showing evidence of the disease to be dipped twice. That was done on account of these districts being in range country where it was impossible to know what diseased animals may have passed overland and it might subsequently travel through all the animals, and for that reason all animals in

those districts were considered as exposed, and upon inspection it was determined whether they were infected or not.

The CHAIRMAN. Please take up this question of mange in cattle and the necessity for the increase in that appropriation. That is part of the estimated increase for scab in sheep and mange in cattle?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. Is your information pretty reliable that mange in cattle is on the increase?

Doctor MELVIN. I will not say that now, but prior to the time when the Department took up the eradication work, I do not think it had ever been so widespread.

The CHAIRMAN. I found in northern Texas this fall that they hadn't it there at all and did not know of it, and from all the information I could gather they did not pay any attention to it and did not seem to be worried about it at all.

Doctor MELVIN. There is not a large portion of Texas affected. In the western portion of Texas adjoining New Mexico they have mange, and down toward the Gulf there are four or five counties where they have some mange, but not much. This infection exists very largely from Canada down to the Gulf and east of the Rocky Mountains and west of the eastern third of the two Dakotas and Nebraska and Kansas—from there west through that range belt.

The CHAIRMAN. There is none in the Eastern States at all?

Doctor MELVIN. I have only run across few cases; there is very little. There is some, but not much.

The CHAIRMAN. I handle western cattle and I have not run across a single case.

Doctor MELVIN. We had a case before us this week in Chicago of an animal from Illinois, but we have not quarantined any of those States on account of it—those States east of the Missouri River.

The CHAIRMAN. How contagious is it? I know it is rather a difficult thing to say, but is it as contagious as sheep scab?

Doctor MELVIN. No, sir; I do not think it is, because the hair of the cattle is short and is not so easily pulled off and scattered about as the wool of the sheep is.

The CHAIRMAN. Is it a little parasite?

Doctor MELVIN. Yes, sir; almost identical with the sheep scab.

The CHAIRMAN. If the animal is left to himself, what happens?

Doctor MELVIN. If they receive good food in the summer, if they have plenty of grass or they are put in feeding lots where they could get plenty of food, they improve in condition very much and some of them will ultimately get well, but I doubt very much if all of them would get well. Their condition, however, is very much improved. Then, during the winter when they are subjected to short feed and cold and exposure it is very severe on them, and those animals that are affected with mange are more apt to die than to live.

The CHAIRMAN. Your description tallies exactly with what I heard in the West.

Doctor MELVIN. If an animal's environments are unfavorable the mange adds very greatly to those unfavorable environments.

The CHAIRMAN. What do you propose to do further along the line of attempting to eradicate mange?

Doctor MELVIN. I do not think with this additional appropriation we will be able to extend our work any more than at present in

cattle and in sheep. I hope to be able to extend some further cooperation to some of these States that have requested it and to continue cooperation with some States that we are now cooperating with. As an illustration, in Wyoming and Idaho, we have practically eradicated sheep scab, but in order to make sure it will be necessary to make an inspection of those animals again in the spring at the shearing time so that in case there is any disease left behind we can discover it and cure it. That will require considerable force, probably thirty or forty men for several months.

The CHAIRMAN. Where do you propose to get those men from?

Doctor MELVIN. We secure that force from our men at the meat-inspection centers by the selection of men who are adapted to this sort of work.

The CHAIRMAN. They are under salary now and will be simply transferred from one place to another?

Doctor MELVIN. No; we have extended inspection to several establishments this fall, and that work was done by men who were transferred back from the field. In addition we have had a number of men resign from the service and their places have not been filled, except by the transfer of those men back from the field.

The CHAIRMAN. Does the committee understand you to say that you would have to employ thirty or forty additional men?

Doctor MELVIN. It would result in that; yes, sir.

The CHAIRMAN. Where would you get them?

Doctor MELVIN. From the Civil Service Commission; not these particular men who would be assigned to this work, but there would be an increase of that number in our force.

The CHAIRMAN. You would assign the more experienced men to this work?

Dr. MELVIN. Yes, sir; and put the new men in their places.

Mr. FIELD. Are these inspectors veterinary surgeons?

Dr. MELVIN. The majority of them, not all. The men who prepare and oversee the dipping of the sheep are usually not veterinarians. They are a smaller paid class of men, known as taggers and stock inspectors. The inspections are nearly all made by veterinarians.

Mr. HAUGEN. In my part of the country a considerable number of sheep have been shipped in, and very little is known of this sheep-raising business, and I would like to inquire as to what kind of dips you use and what you would recommend for that part of the country—the northeastern part of Iowa? I am just asking for information, in order that I may reply intelligently to inquiries.

Dr. MELVIN. The lime and sulphur and sulphur and tobacco dips I have already mentioned would be entirely proper.

The CHAIRMAN. You propose to try to eradicate mange by quarantine and inspection and by dipping?

Dr. MELVIN. Yes, sir.

The CHAIRMAN. Suppose you go into a herd of 10,000 cattle and you find five or six cattle affected with mange, what would be your programme? What would you do with the herd of cattle?

Dr. MELVIN. Nearly all of these Western States are now under quarantine of the Department, of course local quarantines; small and circumscribed, and can only be enforced by the local authorities.

The CHAIRMAN. Will they cooperate with you to the extent that they will quarantine a man's farm upon which you have found mange?

Dr. MELVIN. Yes, sir.

The CHAIRMAN. After quarantine, what is the next step in the case I suggest—five or six head in a 10,000 herd?

Dr. MELVIN. This work is nearly all confined to the range district.

The CHAIRMAN. That is why I gave the large herd of 10,000. What would you do with such herd of cattle?

Doctor MELVIN. We have to be governed by circumstances. If these animals had been in such close contact that there was reason to believe that the balance of the herd had been exposed, it would be necessary to dip the cattle—all of them. If, on the other hand, this 10,000 lot of cattle were drifting and not closely associated with each other, the dipping would be confined to those that were diseased and those in the immediate vicinity.

The CHAIRMAN. You know how cattle range on the plains, in small bunches all over, very seldom in large herds. You would just take the little bunch found around the diseased animals?

Doctor MELVIN. Yes, sir. Mange, particularly in cattle, will extend for a number of years. It is impossible to eradicate it within the course of one or two or three years for the reason that it is impossible to gather all the cattle in the round-ups, and a usual round-up will not produce more than 80 per cent of an owner's cattle. It is fair to presume that out of the 20 per cent remaining there is some mange left behind, and so it will require a series of years to exterminate mange.

Mr. SCOTT. Was mange produced in the first instance in our country, or did it come from cattle imported from some other country?

Doctor MELVIN. I do not think it originated in this country. I think it was originally imported. I can not answer that question any more definitely. Of course, it is an animal parasite.

The CHAIRMAN. The kind of cattle brought to this country is not of that kind, as a rule; they are fine bred and well taken care of.

Doctor MELVIN. I have seen or known of mange being developed in the West from high-bred cattle bought in the East—breeding cattle.

The CHAIRMAN. I wish you would take up the subject of the post-mortem examination and the microscopic examination. You ask an increase of how much for that purpose?

Doctor MELVIN. We have estimated altogether \$840,000 for what we term the regular meat inspection, ante-mortem and post-mortem.

The CHAIRMAN. Ante-mortem and post-mortem?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. How much increase is that over the present appropriation for that purpose?

Dr. MELVIN. About \$13,000.

The CHAIRMAN. \$13,000 only?

Dr. MELVIN. Yes, sir. Our last year's expenditures under that item were \$827,626, and this year it is estimated at \$840,000.

Mr. SCOTT. Is there not a sum asked for in a deficiency appropriation to continue this work during the remainder of the year of about \$300,000?

Dr. MELVIN. \$135,000. In that item is included an estimate for microscopic examination of pork and this field inspection or range inspection in the West. Those three items are included in the \$135,000. I think that amount would be sufficient. The small establishments which are asking for inspection require but a few men to do the work, one or two men at each place.

The CHAIRMAN. This increased demand for inspection is caused by what?

Dr. MELVIN. We only have the statements of those who ask for it. Their special argument is that their business has largely increased, which it probably has, and they desire to be able to sell their inspected meat products to larger concerns who also have inspection. Without inspection their products can not enter the establishments of the larger ones who have inspection.

The CHAIRMAN. It depends a good deal upon the attitude of Germany, what Germany is going to do with our products.

Dr. MELVIN. They handle very little of our beef products.

The CHAIRMAN. But the pork?

Dr. MELVIN. This official inspection is caused more largely by beef butchers than by hog butchers, this regular inspection.

The CHAIRMAN. That is for home consumption?

Dr. MELVIN. Yes, sir.

The CHAIRMAN. Interstate commerce, but for home consumption in the United States?

Dr. MELVIN. Yes, sir.

Mr. HAUGEN. The inspection is necessary for the home trade?

Dr. MELVIN. The Department has never undertaken to prohibit the interstate shipment of all meats except those inspected. We never considered ourselves in a position to do that.

Mr. HAUGEN. In order to sell any meat it is necessary to have it inspected, whether it is sold at home or abroad?

Doctor MELVIN. The beef must be inspected before it can be shipped abroad. All beef must be inspected before it can be exported. Other meats can be exported without inspection if marked so as to indicate the kind of animal it is made from.

Mr. HAUGEN. The contention is that the meat must be inspected in order to find a market for it at home just as well as abroad.

Doctor MELVIN. The Department has never been authorized to make inspection of meat except for interstate and export trade (not for local consumption), but, as we understand, it is necessary to inspect all the meat slaughtered in an establishment in order that that which is for interstate and export trade will be inspected.

Mr. HAUGEN. A small plant that probably kills 100 head and finds a market within 100 miles of the abattoir, in order to find a market for its meat, it is necessary to have it inspected, as I understand it, and you assign an inspector to the smaller plant, a plant that would kill, say, 100 head a week?

Doctor MELVIN. Yes, sir; we have inspectors at plants which are no larger than that.

Mr. HAUGEN. They do not export any meat?

Doctor MELVIN. Indirectly they do; they sell parts of their production to others who do export.

The CHAIRMAN. Here is a letter, part of which I will read:

DENVER, COLO., *January 15, 1906.*

HON. J. W. WADSWORTH,
House of Representatives, Washington, D. C.

MY DEAR MR. WADSWORTH:

* * * * *

We are all very much interested in seeing Secretary Wilson get enough money to pay the meat inspectors at the packing houses. I know you are heart and soul with the cattlemen, and it is hardly necessary for me to mention the importance of this matter. If they are going to economize any with their appropriations, I think that something could be done on the mange inspection, where they seem to be spending a good deal of money at the markets inspecting for mange without any good results that I can see. I have always felt that in the Rocky Mountains this mange business was more or less of a farce.

Yours, truly,

A. E. DE RICQLES, *General Manager.*

The CHAIRMAN. I think the danger is exaggerated in the mange business.

Dr. MELVIN. I have understood the position of the writer of that letter in the matter for some time. He is not a cattle owner directly.

The CHAIRMAN. He is a purchaser.

Dr. MELVIN. He is with a concern that buys, and sells, and mortgages their cattle.

The CHAIRMAN. Yes, sir.

Dr. MELVIN. And of course not being directly responsible, except in an indirect way, he has not the same interest as other cattle owners have.

The CHAIRMAN. The company of which he is president, if they bought a lot of cattle and there was mange, would incur the loss, so the danger to them would be just the same as to other cattle owners.

Mr. HAUGEN. How many packing houses are there where you assign inspectors?

Doctor MELVIN. One hundred and fifty-one establishments.

Mr. LORIMER. Is the ante-mortem inspection necessary? For instance, at the stockyards they inspect cattle before taking them into the slaughterhouse, and then they have the post-mortem inspection. Are they both essential?

Doctor MELVIN. There are some conditions that can be better ascertained in the live animal than at the time of slaughtering. Take the case of animals in advanced pregnancy. It is possible to segregate those cattle so that they need not be slaughtered at that time—cattle that would be condemned at slaughtering. This does not apply to hogs so largely, because we do not encourage their being shipped, for fear of spreading the hog cholera. Also with immature calves—they can be better judged alive than after they have been killed, but I think our ante-mortem inspection might be greatly reduced if the law was changed so that it would make it a little more optional with the Secretary. The law at present reads: "That the Secretary shall cause to be made inspection," etc., and if that "shall" was changed to "may" I think it would give him all the power he requires, and allow him to modify it where he considers it advisable to do so.

Mr. LORIMER. Would there be any considerable saving as a result of that change in the law?

Doctor MELVIN. I think there would be.

Mr. HAUGEN. The expenses are not very great?

Doctor MELVIN. I think it cost about \$250,000—the ante-mortem inspection.

Mr. HAUGEN. How many inspectors would you have in South St. Paul, for instance, inspecting live stock?

Doctor MELVIN. I do not think more than four.

Mr. LORIMER. Can you make an estimate of what might be saved if the Secretary had the authority to select the stock that he would inspect before slaughtering?

Doctor MELVIN. Possibly one-third.

Mr. LORIMER. One-third of the \$250,000?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. What portion of the law do you refer to; where is the item?

Doctor MELVIN. I do not think that appears in this item.

The CHAIRMAN. You are acting practically under authority granted by this paragraph?

Doctor MELVIN. A law was passed in 1895, the act of March 3.

The CHAIRMAN. Right there before we forget, you notice the language, "And to prevent the spread of pleuro-pneumonia, blackleg, tuberculosis, sheep scab, glanders or farcy, hog cholera, and other diseases of animals;" under "other diseases" would not the tick come in?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. We want to avoid as far as possible making special appropriations for specific purposes.

Doctor MELVIN. Yes, sir. Texas fever, which, of course, is disseminated by the tick, has always been considered an infectious disease, and it has always been treated as such, except that Congress has provided for the shipment of cattle to market under certain conditions for slaughter. That appears in the law. It says: "Provided that the so-called Texas or Southern fever shall not be considered an infectious disease within the meaning of this act with reference to cattle shipped to market centers for slaughter."

The CHAIRMAN. We will want to take up the cost of inspection, and whether it would be fair or right to charge the packers and others wanting this inspection with the actual cost of it or not, and on that point we will hear Dr. Melvin and also the Secretary of Agriculture, and I move that the committee now adjourn until Saturday morning at 10.30 o'clock.

Thereupon the committee adjourned to meet on Saturday, January 20, 1906, at 10.30 o'clock a. m.

COMMITTEE ON AGRICULTURE,
Saturday, January 20, 1906.

The committee met at 10.40 a. m., Hon. J. W. Wadsworth in the chair.

The CHAIRMAN. Gentlemen, the Secretary of Agriculture and Dr. Melvin are before us by request of the committee to give their views in regard to the policy in the future of making some charge for the inspection to the packers and slaughterers over the country. That is

a question that was taken up some years ago by the committee and gone into pretty thoroughly, and at one time we determined to charge the slaughterers and packers simply the actual cost. Finally it was abandoned; but there has been among many members of the committee a strong feeling that these people should pay a portion, at least, of the cost. On that proposition we have asked them to come before the committee.

I think Dr. Melvin has certain figures in regard to the cost of the inspection, and then we should like to hear from the Secretary as to what he thinks of the policy of charging those people for the inspections, either the whole cost or part of the cost. You can decide upon what order in which to proceed.

Secretary WILSON. Did you have some figures that the committee wanted? If so, let them have the figures, Dr. Melvin.

STATEMENT OF HON. JAMES WILSON, SECRETARY OF AGRICULTURE, ACCOMPANIED BY DR. ALONZO D. MELVIN, CHIEF BUREAU OF ANIMAL INDUSTRY.

Mr. SCOTT. I understand that the packers are now supplying the tags, and perhaps some little things that used to be furnished by the Government, and I would suggest that Dr. Melvin give us the facts in regard to that and let us know whether any protest was made by the packers.

The CHAIRMAN. We want to know the whole history, what you have of it, from different points of view—both you and the Secretary; the cost of it, and the number of inspections.

Doctor MELVIN. With reference to the meat-inspection label which is placed upon freshly killed inspected meat, those labels and all other forms of device for marking the inspected meat have been furnished by the Department. On account of the limited appropriation during the present year it was considered necessary to make some reduction in the expenses, so that the work could be carried on within the appropriation, and opinion was obtained to the effect that the cost of the labels might be placed upon those owning the animals. These labels cost 65 cents a thousand and we have been using something over 5,000,000 a month. The packers were requested to furnish labels, and some of them did so upon simple notification and others did so under protest, but all furnished them. This has resulted in a saving to the Government of about \$35,000 for the balance of the fiscal year—i. e., from the time it was inaugurated until the close of the fiscal year there will have been saved about \$35,000.

The CHAIRMAN. How long a time was that—how many months?

Doctor MELVIN. Commencing on November 1.

The CHAIRMAN. And up to when?

Doctor MELVIN. Up to the end of the fiscal year. This also included the cost of the meat-inspection stamp, which is a paper stamp placed upon packages and boxes containing inspected meat.

This is a less item. We use of those stamps about 2,000,000 a month, and they cost, I think, 23 or 24 cents a thousand; but that is also included in this amount of saving.

The CHAIRMAN. What is the amount which the Government pays out annually for post-mortem inspections; what was the total amount during the last fiscal year ending June 30, 1905?

Doctor MELVIN. The total expense amounts to \$827,531.

The CHAIRMAN. How much of that was for microscopic inspection?

Doctor MELVIN. That amount does not include the microscopic inspection.

Mr. SCOTT. That is for one year?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. What is the amount for the microscopic inspection of pork?

Dr. MELVIN. The microscopic inspection costs \$56,212.

The CHAIRMAN. That is a total of eight hundred and seventy odd thousand dollars for inspection?

Dr. MELVIN. \$883,000.

Mr. SCOTT. Your first large item, \$827,000, included both the ante and post mortem inspections?

Dr. MELVIN. Yes, sir. What we term the regular inspections.

The CHAIRMAN. Have you separated the ante from the post mortem inspections?

Dr. MELVIN. We have estimated the expense of the post-mortem inspection at 70 per cent and the ante-mortem inspection at 30 per cent.

The CHAIRMAN. Will you please tell the committee just what your ante-mortem inspection consists of?

Dr. MELVIN. At the large live-stock centers it consists of the inspection of all animals received at the stock yards before they are driven to the different abattoirs. This inspection is considered necessary to detect diseases which are more readily detected in the live animal than in the animal after it has been killed. This inspection is required by the law under which we are operating.

Mr. SCOTT. Are there any diseases which would materially injure the flesh that may be detected by an ante-mortem inspection which would escape detection by a post-mortem inspection?

Dr. MELVIN. It is frequently possible to detect animals that have been injured or have become sick from various causes so as to produce an abnormal temperature, and it is also a better time to discover animals that have recently given birth to young or are near the period of parturition. Those are conditions which are considered sufficient to render the meat unfit for food and are better determined at that time. Frequently cases of tuberculosis are discovered in animals where the glands of the head and neck are involved, although that would also be discovered on a post-mortem inspection. The same obtains with reference to actinomycosis or "lumpjaw." That is only considered dangerous when the disease has advanced or become generally infectious.

Mr. SCOTT. As I understand, then, all the really dangerous conditions which would make the meat not only unwholesome, but which would positively threaten the health of anyone, can be detected by ante-mortem inspection?

Doctor MELVIN. Those are some of the conditions I have mentioned where they can be determined more readily alive than dead. To reverse the conditions, there are many diseases that can not be determined on an ante-mortem inspection that could be determined on a post-mortem inspection; it is largely in favor of the post-mortem inspection.

Mr. SCOTT. If you have to omit either, it is much more important that the post-mortem inspection should be continued?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. Please tell the committee what you do when your inspector finds an animal in the ante-mortem inspection that he thinks is unfit for food.

Doctor MELVIN. The conditions vary at the different live-stock centers. The Department leaves that largely to the conditions obtaining at the various markets. In the city of Omaha, for instance, or South Omaha, the condemned animals are tagged with a metal tag and allowed to go to the various slaughterhouses, and are there slaughtered by the various packers, subject to the result of the post-mortem examination. In Chicago these animals are similarly tagged and are then rejected by the packers. The large packers do not touch them at all. There are smaller packers who have made a specialty of this business, who buy up these "rejects," as they are called, and they are sold for what they bring. The buyer takes his chances on their passing or being condemned, and they are also slaughtered under Government inspection.

The CHAIRMAN. How do you continue this inspection—how do you avoid being deceived by these people? What prevents the slaughterer, if you are dealing with a dishonest man, from substituting another carcass for the one you condemned by the ante-mortem inspection?

Doctor MELVIN. The tags are all numbered in serial numbers and records are kept and permits are issued by the inspectors in the yards for the animals to go to the various slaughterhouses.

Secretary WILSON. Then, you have the inspectors in the packing house?

Doctor MELVIN. Yes, sir.

Secretary WILSON. And they identify each carcass by the tag?

Doctor MELVIN. Yes, sir.

Mr. SCOTT. What the chairman was inquiring about and what I would like to know is, what precaution is taken to prevent the tag from being shifted to an animal that would pass the inspection?

The CHAIRMAN. Or to the carcass after the animal is dressed. You tag the animal in the ear?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. And when the skin is taken off the ear goes with it and that detaches the tag from the carcass. Have you any means of preventing the substitution of another carcass in the slaughter?

Doctor MELVIN. The inspector is there at the time the animal is killed and slaughtered. Therefore he sees the tag on the animal before and while it is being slaughtered.

The CHAIRMAN. That is done by the ante-mortem inspector or the post-mortem inspector?

Doctor MELVIN. The post-mortem inspector, located at the killing establishment. A description accompanies this tag number of the animal. There is not much possibility of that substitution being made.

The CHAIRMAN. If you find the carcass unfit for food after the post-mortem examination, then, what happens?

Doctor MELVIN. It is condemned by the inspector and a heavy

paper tag is attached to the carcass by a leaden wire seal. Then this carcass is run into a special room which is set aside in the packing house and there locked up, and our inspector controls the lock and key to that room. Then when the establishment is ready to tank the animals in their fertilizer tanks the inspector is called and accompanies the carcasses and sees that they go into the rendering tank. The top and bottom of this tank are then sealed by another leaden wire seal and there kept under steam for a period sufficient to destroy them for food purposes. Accompanying this carcass is a sufficient amount of offal to render it impossible to use the product for food purposes.

The CHAIRMAN. Will you kindly describe to the committee the post-mortem examination of hogs and beef cattle?

Doctor MELVIN. The post-mortem examination of hogs is made as follows: There is a long table on which these hogs are placed after they come out of the scalding room.

The CHAIRMAN. After they are scraped?

Doctor MELVIN. They are being scraped with knives. They are being finished on this table with long knives. At the end of this table the animal is almost decapitated; a sufficient part of the skin is left there to hold the head to the balance of the carcass. The inspector is there, and he examines the glands of the head and neck to determine whether there is evidence of tuberculosis. In case he finds it a tag is placed on this animal and then it goes down a rail to what is termed the "cooper's bench," where the entrails are removed. An inspector is located there, and he examines the entrails as they are removed. If he finds further evidence of disease it is marked in another manner and proceeds to a separate rail, where all similar animals are placed. At different periods during the day, when he can do so, he makes a minute examination of the viscera which is attached to this carcass and then decides what disposition shall be made of it.

The CHAIRMAN. The carcass that was to be tanked was treated in the same way as you have described?

Doctor MELVIN. Yes, sir. The carcasses are not run along a rail, like hogs, but are placed on the floor of the killing bed and the inspector passes along with the butcher, who removes the viscera, and as it is removed from the carcass he inspects it to determine whether there is disease present or not. He goes to one end of the killing floor and then goes back with the same butcher and repeats the operation. Calves and sheep are killed differently at different establishments, but generally the same line of procedure is observed.

The CHAIRMAN. Have you any figures showing the proportion of hogs killed and eaten in this country to the proportion actually inspected by the Government? What proportion of the hogs killed in this country are eaten in this country?

Doctor MELVIN. I have not been able to get at the number of hogs; but we have taken the statistics of the Census Bureau, and, from those statistics, we have been able to determine that about 75 per cent of the total meat consumed in this country is from inspected animals.

The CHAIRMAN. 75 per cent is from inspected animals?

Doctor MELVIN. Yes, sir. I am not vouching for those figures, but they would indicate that amount.

The CHAIRMAN. That hardly seems possible when you take into consideration the hogs eaten all over the country, which are killed in the small villages and cities, towns of 10,000, 15,000, and 20,000 inhabitants, and on all the farms. It does not seem possible that 75 per cent of the hogs are inspected.

Doctor MELVIN. I think that is apt to take in all the prominent packing establishments through Iowa, Kansas, and Illinois, and in the other cities which have our inspection. That more largely applies to hogs than it does to cattle. You take the smaller villages—they kill a few cattle, but our inspection is now confined to 151 establishments. Lately it has been extended some, and it now probably includes 160 of the largest establishments in the country.

The CHAIRMAN. How did you arrive at those figures—on what figures of the Census Office did you base your result of 75 per cent?

Doctor MELVIN. The per capita consumption of meat in the country as furnished by the Census Bureau.

The CHAIRMAN. What does that show; have you the figures there?

Doctor MELVIN. I have not the figures here, but, as I recollect, it was based on the estimate of 119 pounds per annum per capita in the United States.

The CHAIRMAN. You have the figures of how much you have inspected?

Doctor MELVIN. Not in pounds. We have the approximate weight of the different classes of animals we have inspected.

The CHAIRMAN. At what do you estimate the average hog?

Doctor MELVIN. 150 pounds.

The CHAIRMAN. Dressed?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. That 75 per cent includes the beef and pork?

Doctor MELVIN. All meat products.

The CHAIRMAN. In other words, you estimate that according to the figures that they base their estimate on 75 per cent of all meat consumed in the United States has the benefit of Government inspection?

Doctor MELVIN. Yes, sir. There are very few large establishments without inspection.

The CHAIRMAN. That is true. Have you deducted the amount that goes to Europe—the exports?

Doctor MELVIN. Yes, sir; that is given in pounds. We take that from the census.

Mr. HAUGEN. How many cattle were inspected last year?

Doctor MELVIN. The number inspected in 1905 was 6,096,597.

Mr. HAUGEN. How many hogs were inspected last year?

Doctor MELVIN. 25,323,984, and sheep 7,872,671. Those figures all appear in the report of last year.

Mr. HAUGEN. Is it not possible for you to make some estimate of the number of cattle, hogs, and sheep that are slaughtered in the aggregate in the United States?

Doctor MELVIN. No, sir; I do not think there are any figures that are reliable. The Census Bureau has undertaken to do that, but I do not think the figures were sufficiently accurate to be considered. I would not want to use them.

Mr. HAUGEN. I think in the United States there are about 31,000,000 swine killed and only 25,000,000 are inspected.

Doctor MELVIN. Twenty-five million slaughtered and inspected.

Mr. HAUGEN. I think there are more than 31,000,000 or 32,000,000 slaughtered every year, when you stop to consider that there is about 50 per cent of the people of the United States living on farms.

Secretary WILSON. There is about 40 per cent of the people farmers in the United States.

The CHAIRMAN. Please finish your statement in regard to the microscopic inspection. Tell us exactly how it is done.

Doctor MELVIN. The animals that are to be inspected, of course, have been slaughtered and are then placed on a separate rail.

The CHAIRMAN. They have gone through this preliminary examination?

Doctor MELVIN. Yes, sir; what we term the "regular inspection," and are then separated according to their size for packing for this export trade. Then there is taken from three parts, the diaphragm, the shoulder, and the tenderloin muscles, small portions. These are placed in a small tin box with a number. The duplicate of this number is attached to the carcass. This small box is placed in another box containing 100 each, and is then taken to the room where the microscopic inspection is made by ladies who are employed for that purpose. Careful records are made of this inspection, and in case trichina is found the hog is traced from the duplicate number and is then removed and either rendered into lard or cooked, so as to kill all the trichina that may be in the hog, cooked under the supervision of our inspectors. The balance of them are then cut up and placed in a separate cellar, which is under lock and key furnished and provided by the Department, and a record is kept of all meat that goes in and out of this cellar.

Where meats are cured and it is desired to ship them the man in charge of the cellar is notified, and the meats are then removed and packed under his supervision, and a purple stamp is attached to the box and a certificate is issued certifying to the nature of the inspection, and including the numbers of the various boxes in the shipment.

Mr. SCOTT. How often do you find trichina in American hogs?

Doctor MELVIN. There is about $1\frac{1}{2}$ per cent of hogs rejected. But one-half of those "rejects" are live trichina that are beyond question. The other half is a group of trichina-like bodies that might be regarded with suspicion and are rejected only on that account.

Mr. SCOTT. You mean that there is in the neighborhood of one hog out of every hundred that is infected?

Doctor MELVIN. Less than one out of a hundred that is affected with live trichina—about eight-tenths of 1 per cent.

Mr. HENRY. One per cent will cover the whole loss?

Doctor MELVIN. Yes, sir; less than that. About eight-tenths of 1 per cent are affected with live trichina.

Mr. SCOTT. Is it as dangerous as is frequently represented, to use this kind of meat for food?

Doctor MELVIN. No, sir; it is not considered dangerous at all when it is subjected to salting, as we do in this country. Ordinary cooking will also destroy the trichina, and apparently it does not render the meat unnutritious.

Mr. SCOTT. Is there any reason you can suggest why the hogs should be infected in this way?

Doctor MELVIN. It is generally supposed that it is on account of the hogs being permitted to consume any other animals that may have died from the disease, and also the consumption of rats which are around granaries and which hogs will consume if they can get them.

Mr. SCOTT. Do the trichina ever kill the hog itself?

Doctor MELVIN. I have no information that it has.

Mr. HENRY. Has that experiment ever been made?

Doctor MELVIN. I do not think that there is any probability that they do. We have found them where they were very greatly infested and in splendid prime condition, showing no disturbance apparently whatever.

Mr. SCOTT. There were no ante-mortem signs at all?

Doctor MELVIN. No, sir; absolutely none.

The CHAIRMAN. After the hog is salted or the meat is cooked there is no danger to human life?

Doctor MELVIN. No, sir.

The CHAIRMAN. About tuberculosis germs—what is the percentage of condemnation on account of tuberculosis?

Doctor MELVIN. I can only give you the number; I have not the per cent.

The CHAIRMAN. When I was in Chicago it was about 1 per cent or 1½ per cent; and perhaps that was extreme.

Doctor MELVIN. You mean the hogs?

The CHAIRMAN. Yes, sir.

Mr. SCOTT. It is less in hogs than in cattle?

Doctor MELVIN. No, sir; it seems to be more prevalent at times among hogs than among cattle.

The CHAIRMAN. Is there any danger if the hog is slightly affected with tuberculosis if the meat is salted or cooked?

Doctor MELVIN. We class tuberculosis in two divisions—one of "generalized" and one of "localized." Then they are again considered as being extensive or not. In generalized tuberculosis we consider the different glands of the body infected, and we always consider those features, whether the disease is extensive or slight. In "localized," that is when it is confined to the viscera of the animal and the organs in the body cavities, and when that is slight it is considered fit for food without any body glands being infected; but when it is extensive, even when it is confined to the organs of the body, the carcass is also condemned. It very often follows that in a slight case of tuberculosis it will be "generalized" and not only the lungs, liver, and glands of the intestines will be infected, but also all the lymphatic glands in the body will show the disease, and in all of those cases we consider it necessary to condemn the animal.

The CHAIRMAN. But if the meat of the animal is salted or cooked there is no danger?

Doctor MELVIN. Salting I do not think would destroy the bacilli. Extensive cooking would, but there would be a probability of the toxine remaining in the meat which would not be altered by cooking.

The CHAIRMAN. Has any case of tuberculosis ever been traced to eating a hog affected with tuberculosis directly?

Doctor MELVIN. Not definitely. Of course it is impossible to experiment on human beings and we have not been able to demonstrate it.

The CHAIRMAN. Do you know whether or not most of the tuber-

culosis in hogs is confined to sections of the country where hogs are fed upon the milk of creameries?

Doctor MELVIN. There is a question as to just what channels there are through which the hog becomes infected. There is no doubt but what products from creameries in the neighborhood where the cows are affected with tuberculosis cause the disease. It has also been proven that hogs with tuberculosis come from farms where there is no evidence of tuberculosis whatever among the cows and where they have not been fed on dairy products. It is presumed that the infection came from their mothers, the brood sow.

The CHAIRMAN. Where did they get it?

Dr. MELVIN. They may have gotten it in turn from their mothers or from eating some body that had tuberculosis in it, like the carcass of an animal that had died from tuberculosis or dairy products that were infected.

The CHAIRMAN. There was an order issued by the Department which was in effect while I was in Chicago under which they were condemning a tremendous number of hogs, about 100 a day possibly, a hundred on Monday, a hundred on Tuesday, and 67 on Wednesday.

That order was modified afterwards so that the number of animals condemned was less. Is that true?

Dr. MELVIN. It was modified so that a larger number of the animals that were slightly affected, where the infection was "localized," could be placed in the lard tanks.

The CHAIRMAN. What was the original order? It was probably done before you came to the Department.

Doctor MELVIN. The original order required all animals to be placed in the offal tank where there was any infection in both of the body cavities—that is, the thoracic and the abdominal cavity—no matter how slight or extensive it might have been. This modified order permits animals slightly affected, where the infection is in both of these cavities, to be rendered into lard.

The CHAIRMAN. On the theory that the heat to which they are subjected will be sufficient to kill any germs?

Doctor MELVIN. There was no evidence of infection of the meat of the animal, and as the diseased parts were removed—that is, the diseased organs—the balance was all to be rendered into lard, and that the cooking would destroy any possible remaining tubercular matter.

The CHAIRMAN. What figures have you to give us on the cost of this inspection per piece, per animal, so that the committee can get at what would be the cost to the packers?

Doctor MELVIN. The cost of the microscopic inspection averages 16.27 cents for the carcass.

The CHAIRMAN. That is for three pieces from a carcass, as I understand it?

Doctor MELVIN. Yes, sir; and thirty-eight one hundredths of 1 cent for each one exported.

The CHAIRMAN. A little over a third of a cent?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. How do you arrive at those figures?

Doctor MELVIN. That is the actual cost of the inspection.

The CHAIRMAN. You know that from the number of pieces and the cost thereof?

Doctor MELVIN. Yes, sir; we keep an absolute record.

The CHAIRMAN. Then there is no guesswork about that?

Doctor MELVIN. No, sir.

Mr. COCKS. Speaking again about the 75 per cent which you say is the percentage of meat inspected, does that mean that 75 per cent of all the meat slaughtered in the country is inspected in the large plants which are controlled by five or six men?

Doctor MELVIN. No, sir; there are 151 places where we make inspection.

Mr. COCKS. When you spoke of the large plants that were inspected, I did not know but what you meant only a few big ones.

Doctor MELVIN. In speaking that way, I referred more to those concerns engaged in interstate and export business and did not include the small butcher whose trade was confined to comparatively small localities.

Mr. COCKS. The man who is sending none of the products out of the State, he is not inspected?

Doctor MELVIN. He is not entitled to it under the law.

Mr. COCKS. But if he ships out only 1 per cent, or a very small per cent of his products, he would be entitled to inspection?

Doctor MELVIN. I do not think that we would feel justified in extending the inspection to him.

Mr. COCKS. What would be the per cent going out of the State in which he is located that would entitle him to inspection?

Doctor MELVIN. We never had a definite amount. I think, usually, we consider that they should kill a fair number of animals for interstate trade—25 per cent of their products.

Secretary WILSON. There is a class of little butchers who kill for local use who desire to sell to exporters certain cuts, is there not?

Doctor MELVIN. Yes, sir.

Secretary WILSON. And they may only kill a few, and still they want to sell to the exporters.

The CHAIRMAN. Those people are right in the vicinity of the slaughterers?

Doctor MELVIN. We have one out in Minnesota who wants to sell his product to the packers in Chicago. They are out as far as that.

The CHAIRMAN. Where is he located?

Doctor MELVIN. Mankato, Minn.

The CHAIRMAN. How near is that to St. Paul?

Mr. DAVIS. Seventy-eight miles.

The CHAIRMAN. I thought they were close to the packers; the packers are at St. Paul and Minneapolis.

Mr. DAVIS. Do they sell their products in the South St. Paul stock yards?

Doctor MELVIN. No, sir. His statement was that he wished to ship his inspected dressed beef to Chicago to be sold by his brokers to the various establishments in Chicago.

The CHAIRMAN. What establishments in Chicago?

Doctor MELVIN. I suppose Swift, Armour, and Morris.

The CHAIRMAN. I did not know they would buy any dressed beef.

Doctor MELVIN. If they can buy it at the right figure they buy it.

Secretary WILSON. There is a point not quite clear to the committee. A man killing a very few—we have them in New York—

wants to sell one or two cuts, perhaps, to an exporter, but the exporter will not buy it unless we have inspected it.

Doctor MELVIN. He is not allowed to buy or take it into his establishment unless it has the inspection mark of the Department upon it.

Secretary WILSON. And the Government can not afford to keep a high-salaried man at an establishment that only kills one or two animals a day. We have told the people in the past that if they would get together in one place and do the killing we would make the inspections.

Mr. COCKS. If he is located at Kansas City, Mo., he would have interstate trade anyway, just across the street. At Topeka or Fort Worth, Tex., he might have a big area, but it would be State trade.

Doctor MELVIN. We had trouble by not having sufficient funds to extend inspection to some of the small slaughterers in Kansas. It was not only interstate; but the city of Kansas City excludes meat which does not have the mark of inspection of the Department upon it, and bars that meat out.

Mr. COCKS. There is a packing-house proprietor in Topeka, Charley Wolfe; is his meat inspected?

Doctor MELVIN. Yes, sir; we have had an inspector there for several years.

The CHAIRMAN. How large a house is that? How many cattle do they slaughter?

Doctor MELVIN. I presume they kill from 500 to 600 hogs a day in the season, and probably 100 or 150 cattle a week; something like that.

The CHAIRMAN. Is there any inspection at Rochester, Utica, and Albany?

Doctor MELVIN. No, sir.

The CHAIRMAN. There is a good deal of live stock killed there, to my knowledge.

Doctor MELVIN. We have inspection in New York City, Brooklyn, and Buffalo.

The CHAIRMAN. Buffalo is quite a slaughtering center.

Secretary WILSON. Do not the Chicago packers ship to those places?

The CHAIRMAN. Yes, sir; but there is a lot of live stock shipped from Buffalo down to the coal regions of Pennsylvania. There is quite a big trade which goes down there, all live cattle. These cattle, hogs, and sheep are not subjected to any post-mortem examination after reaching their destination, and knowing all those facts it makes me doubt that 75 per cent are inspected, except you can count those sheep and cattle and hogs that have ante-mortem inspection.

Secretary WILSON. It was seven years ago when the Census Office was put in charge of the whole range of country. What force has that census report got to-day under existing conditions seven years afterwards? The conditions existed then and if the census had been taken absolutely as a census by visitation to every farm it would have been very valuable then, but we have gotten away seven years from that census.

Mr. SCOTT. Can we follow up the cost of this inspection?

The CHAIRMAN. The Secretary had better give the committee his ideas on the policy of having the packers pay part, at least, of the cost of inspection.

Mr. SCOTT. Just before you take that subject up I would like to get at the actual detailed cost. You asked one question of Doctor Melvin and he only answered as to one item, as I understand. He said the microscopic inspection cost 16.27 cents a carcass, and that the average cost of the export inspection was 38/100 of a cent. I would like to ask whether you have figures to show the cost per head of the inspection of cattle, of hogs, and of sheep, separately itemized?

Doctor MELVIN. On both post and ante-mortem?

Mr. SCOTT. Yes, sir. You have given us \$883,743 as the cost of the ante-mortem, post-mortem, and microscopic examinations for the year ending June 30, 1905, and you have told us that there were slaughtered in all 39,293,252 head of stock which were inspected, as I understand you. If these figures are right, then an average cost per head of these inspections would be about 2½ cents, as I figure it. I wondered whether you had any figures on the cost of the inspections, itemized as to cattle, hogs, and sheep.

Doctor MELVIN. The ante-mortem inspections are made in the stock yards, and that is estimated at 30 per cent of the total cost, or \$248,260. For the post-mortem inspection, which is conducted in the slaughterhouses, we have 6,134,388 cattle and 850,227 calves, making a total of 6,984,615 head, at 2 cents per head, making a cost of \$139,692. In hogs there were 25,357,425, at 1½ cents, making a total cost of \$316,967. Of sheep there were 7,878,973, at 1½ cents, making a total of \$137,882, or a grand total of 70 per cent of the whole—\$594,541.

Mr. SCOTT. How much of this eight hundred and eighty odd thousand dollars—

Doctor MELVIN. I wish you would separate the two items.

Mr. SCOTT. I think the question I am going to ask will apply to both. What part of this total amount is salaries, if you know, and what part is to pay the other expenses?

Doctor MELVIN. I have not figured the microscopic inspection in that way, but it is practically all salaries for the microscopic inspection. In the regular inspection the amount of salaries would be \$752,840.

Mr. SCOTT. That should be deducted from what sum to ascertain the amount of other expenses?

Doctor MELVIN. Eight hundred and twenty-seven thousand dollars.

Mr. SCOTT. That leaves about \$75,000.

The CHAIRMAN. So the committee may distinctly understand that you estimate the cost of the microscopic investigation at 16.27 cents per carcass?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. An amount which is equal to about thirty-eight one hundredths of 1 cent per pound.

Doctor MELVIN. That is the cost of the amount that is exported.

The CHAIRMAN. That is the cost for the microscopic inspection?

Doctor MELVIN. Yes, sir; the meat that is actually exported.

The CHAIRMAN. Well, what if it is not exported—if it is used in this country. What would be the cost then?

Doctor MELVIN. It would cost more. Let me explain that. In the carcass this inspection is made of the entire carcass. Now, there may be but four cuts, or possibly six cuts, from this carcass that are put into the cellar and retained for this particular trade. The balance of

that carcass goes into the regular trade. They have to anticipate their orders to a great extent. In the event of not receiving an order for the particular cut, then they have to sell it in the ordinary trade. They can not keep it beyond a certain time, because it becomes too salty and stale; but the actual cost of the inspection of the meat which was actually exported was thirty-eight one hundredths of 1 cent a pound.

The CHAIRMAN. Putting it in a little more practical way, what is the average weight of a hog—about 150 pounds?

Doctor MELVIN. About 200 pounds.

The CHAIRMAN. What is the cost to the packer for the microscopic inspection of that hog?

Doctor MELVIN. 16.27 cents.

The CHAIRMAN. It is a cost to us of 16.27 cents for every 200-pound hog?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. What are the figures as to beef?

Doctor MELVIN. The post-mortem inspection would be 2 cents a head.

The CHAIRMAN. And how many head did you inspect last year of cattle?

Doctor MELVIN. Cattle and calves—we put them together.

The CHAIRMAN. How much is that?

Doctor MELVIN. 6,984,615.

The CHAIRMAN. At 2 cents apiece?

Doctor MELVIN. Making a total of \$139,692. That is the post-mortem inspection.

Mr. SCOTT. What proportion of the 25,000,000 hogs slaughtered was microscopically examined?

Doctor MELVIN. Only a comparatively small number.

Mr. SCOTT. Only those were inspected to go into the export trade?

Doctor MELVIN. Yes, sir; this record shows that there were 346,026 carcasses.

Mr. SCOTT. In the whole country during what time?

Doctor MELVIN. During the last year.

Mr. SCOTT. You do not mean to state that there were only 346,000 hogs sent abroad last year?

Doctor MELVIN. That is, microscopically inspected meat, yes, sir.

Mr. SCOTT. That must be a very small part of the whole amount of our export trade?

Doctor MELVIN. England is our greatest customer. They do not require this inspection. These 346,000 were practically all sent to Germany.

Mr. SCOTT. Is that the reason the Germans are so particular on account of the slight cooking over there?

Doctor MELVIN. I do not think so. As a matter of fact they do not consider this inspection when it gets on the other side. They reinspect it themselves and charge fee.

Mr. COCKS. What is the necessity of our inspection?

Doctor MELVIN. They will not take it without the inspection and at the same time they will not recognize the inspection.

Mr. DAVIS. The inspection fee is really a tariff?

Doctor MELVIN. Yes, sir.

Secretary WILSON. And it is about the same with France. The theory is to keep our meat out.

Doctor MELVIN. But we have never had so much of a trade with France in this particular as with Germany. Germany is the great consumer. Our trade with France has been more largely in hams and the finer kinds of meat. With Germany it is largely the fat bacon.

Mr. LEVER. Do you know what the German fee is?

Doctor MELVIN. It is 12 cents a piece, fifty one-hundredths of a mark.

Mr. COCKS. Each piece or carcass?

Doctor MELVIN. For ham and pickled meats and the like it is fifty one-hundredths of a mark. For bacon, every piece, it is thirty one-hundredths of a mark.

Mr. DAVIS. What percentage of our meats exported must of necessity be microscopically examined?

Secretary WILSON. The figures the chairman has given show the number.

Doctor MELVIN. The number examined for this trade, but it does not show the number sent to England and Holland.

Mr. DAVIS. What I wanted to ascertain was what per cent of our entire export of meats must of necessity be microscopically examined?

Doctor MELVIN. It is not separated here. I have the figures of our export trade, but they include beef and others. It is not separated.

Secretary WILSON. You can get it and put it in when you look over the transcript.

Mr. DAVIS. You might include all meats exported.

Doctor MELVIN. Our fresh meats are excluded and the canned meats are excluded.

Mr. DAVIS. Is Germany the only country which requires this microscopical inspection?

Doctor MELVIN. No, sir; France, Denmark, Spain, Italy, and Austria also require it.

The CHAIRMAN. They do not require it, do they?

Doctor MELVIN. Yes, sir; they do, but we have very little trade with them.

The CHAIRMAN. I understand you to say that the average cost per carcass of hogs for microscopical inspection to the Government is 16 cents?

Doctor MELVIN. Sixteen and twenty-seven one-hundredths cents.

Mr. SCOTT. I think it is important that when Doctor Melvin reads these notes he should fully answer not only the percentage of our exports which must be microscopically examined, but, if possible, how much we spend every year examining in every way meat products for export. In the further discussion of this question it may be important for us to know how much money we spend to protect the health of our own people and the amount of money we spend to promote the interests of the packers.

The CHAIRMAN. Is it possible to separate the two?

Doctor MELVIN. I do not believe it is, because the inspections are all figured together. For instance, we inspect all that is interstate and export at the same time, and the cost would be almost as much, perhaps not quite, but the proportionate cost would be much greater

to inspect only the exports of meat than it would be as we do now to inspect all.

Mr. SCOTT. Perhaps we could get at it approximately if you would state the amount of the export trade?

Doctor MELVIN. It would not do, because in proportion to the amount of meat it would be much greater if it were separated than it is now.

Mr. SCOTT. I understand that, but assuming that we slaughtered 25,000,000 hogs last year, and that the total cost of that inspection was \$300,000, then, if you can show us that 15,000,000 of the carcasses went abroad and 10,000,000 were kept at home, we can come near figuring out the cost of the inspection for the export trade?

Doctor MELVIN. No, sir; I do not think so. For instance, in an establishment killing 500 or 600 hogs a day, we have to have a man there, and presuming they killed only 200 of those hogs for export, it would take that man there just the same, whether they exported 200 or 500 or 600. The same argument would extend to all of our inspections. I presume that, as a matter of fact, if these inspections were to be separated so that the export inspections would be by themselves that it would be then probably 80 per cent of our total cost to-day.

The CHAIRMAN. For the export business?

Doctor MELVIN. Yes, sir.

Secretary WILSON. Our Bureau of Foreign Markets can help you, I think, Doctor, to obtain the number that were sent abroad.

The CHAIRMAN. But, in round numbers, you think that 80 per cent of the microscopically examined meat goes abroad?

Doctor MELVIN. That was figured on the whole regular inspection.

The CHAIRMAN. That is near enough.

The cost of 2 cents for each bullock is remarkably small. That is because you do not have any microscopical examination, or very little, if any?

Doctor MELVIN. No, sir.

The CHAIRMAN. It is the microscopical examination that costs?

Doctor MELVIN. Yes, sir.

Mr. DAVIS. That is principally caused by the exports?

Doctor MELVIN. No, sir; the present law requires us to inspect for interstate as well as export.

Mr. COCKS. The microscopical inspection?

Doctor MELVIN. No; I said the microscopical inspections were all due to the export trade.

The CHAIRMAN. I think that we can hear the Secretary on the question on the justice or injustice——

Mr. LORIMER. Permit me to interrupt you right there. I would like to have it appear in the record whether or not any part of the ante-mortem inspection can be ordinarily dispensed with.

Doctor MELVIN. I think it could be reduced somewhat at some of the largest stockyards by confining it to a system which will eliminate a good many of the animals that are known to be healthy.

Mr. LORIMER. Would that cause the saving of any considerable amount, in your opinion?

Doctor MELVIN. Yes, sir; at those localities it would, and, as I said the other day, I think in those larger stock sections, possibly a third.

Mr. LORIMER. A third of what amount, the total amount?

Doctor MELVIN. A third of the amount for examinations in the locality. At some of the larger centers—at Chicago, Kansas City, Omaha, and St. Joe—it could be reduced possibly a third.

The CHAIRMAN. Please say what you would do in order to save that third.

Doctor MELVIN. The law at present says "that the Secretary shall cause to be made an ante-mortem inspection, etc.," of all live cattle about to be slaughtered in establishments having inspection. If that word "shall" was changed to "may" it would enable us to reduce that force considerably. We have to maintain a very large force to inspect all those animals, and if it was a little more discretionary we could have a smaller number to cover the same territory, but not in quite so detailed a manner as at present.

The CHAIRMAN. You take a bullock that has a little lump below his eye, you do not follow him to the slaughterhouse?

Doctor MELVIN. No, sir.

The CHAIRMAN. Not in a case like that, where it is small?

Doctor MELVIN. No, sir; the animals that are attacked on ante-mortem inspection are those which it is thought would be condemned on the final post-mortem inspection. Of course, quite a proportion of those pass when they are finally examined, because the disease is not sufficiently advanced to warrant absolute condemnation.

The CHAIRMAN. You have an inspector at each of the scales in Chicago?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. And the cattle is examined going on and coming off?

Doctor MELVIN. Going on; yes, sir.

The CHAIRMAN. And the cattle is attacked on the scales if he is under suspicion?

Doctor MELVIN. They are put into small pens and attacked.

The CHAIRMAN. How would you do away with that—how would you reduce the cost of that? That is the most practical way to inspect. Practically 99½ per cent of the cattle sold in Chicago are sold by weight?

Doctor MELVIN. Where there is an animal that would evidently be condemned, that animal is not weighed; it is kept back in the pens and sold by the head, and it then becomes necessary to have another set of men who are free of the scales to go through the yards and inspect those few animals that are kept back, and it is my opinion that we might do away absolutely with all these men at the scales and have, say, two-thirds of their number, free to go through the yards and the same result would be accomplished.

The CHAIRMAN. I know that in Buffalo—right along these lines—the inspectors are not busy one-quarter of the time. There is only a market two days in the week. Chicago is different; but in Buffalo I know the inspectors are not busy more than one-quarter of the time.

Doctor MELVIN. But they have quite a number of animals to examine every day of the week on account of the large traffic through the yards.

The CHAIRMAN. Are the cattle going from Chicago to the seaboard inspected there?

Doctor MELVIN. Yes, sir; wherever we have inspection they are inspected, and they are also inspected at the seaboard. They are sent to their destination and then are examined at Boston, New York, or Philadelphia before going aboard the ships.

The CHAIRMAN. I did not know they were examined in transit.

Doctor MELVIN. The reason for that is to protect them so as to see that they are unloaded only in pens absolutely clean or known to be clean, so that they will not be exposed to any disease like Texas fever en route.

Mr. LORIMER. What part of the \$250,000 which is set aside for ante-mortem inspection is expended in these yards where you think this change could profitably be made?

Doctor MELVIN. Probably half of it.

Mr. LORIMER. \$125,000?

Doctor MELVIN. Yes, sir; I should think about that amount.

The CHAIRMAN. If any money was saved along that line it could be used to exterminate the disease more aggressively, and probably if once exterminated it could be kept out of the country by slight inspection.

Mr. FIELD. Under the inspection made by the Government, can the presence of hog cholera always be detected?

Doctor MELVIN. Alive?

Mr. FIELD. Yes, sir.

Doctor MELVIN. No, sir; not always.

Mr. FIELD. By the post-mortem examination?

Doctor MELVIN. Yes, sir; if it is at all manifest it would be detected on the post-mortem examination.

Mr. HAUGEN. Then are they condemned?

Doctor MELVIN. Yes, sir.

Mr. HAUGEN. The whole hog is condemned?

Doctor MELVIN. Yes, sir.

The CHAIRMAN. We will now hear the Secretary on the justice or injustice of the Government asking the packers to share in full or in part the cost of the inspection.

Secretary WILSON. There are a few facts along that line which I will state. We are the great meat-producing nation of the world. We have built up a reputation for care in the preparation of our exports. We have the healthiest animals in the world now, and our products go everywhere.

If there is going to be as much difficulty in the future as now in getting money to pay for the inspection as it is carried on now, it is much better to have the packers, which means the producers, pay the expense of the inspection, so that they can get the product out of the country, than to have the conditions recur as we have them now. We have not been able to make the inspection that our traders have required. We are not doing it now. The prospect is that we are not going to get the money from Congress with which to do it. From that view of the case, it is much better for the producers of domestic animals to pay the expense of inspection, so the products can be promptly shipped when there is a demand for them, than to have the Government appropriate the money sporadically, as has been done lately. It raises the question that those of us who are compelled by law to do this work are disposed to be extravagant.

disposed to intrench on the integrity of the statutes as they are enacted, and it is a very uncomfortable position for the Department of Agriculture to be in. If there is not going to be a free expenditure of money to meet the requirements of the trade, I would advise the committee to make the experiment of allowing the packers to pay part of the expense or the whole of it rather than to have the present conditions continue.

The CHAIRMAN. Would you furnish the inspection to all who demand it, little and big?

Secretary WILSON. No. A man who wants to kill one steer, three sheep, and two hogs a week can not expect a high-priced man to stand at his elbow all the time. It is out of the question.

The CHAIRMAN. If he pays for it?

Secretary WILSON. If he pays for the salary of the man? The trouble is with the small packer who says he can not get the inspection while the big packer is favored. Complaint comes all along the line. Cudahy, of Milwaukee, wrote to us in desperation, "If you will only send inspectors we will pay for them." I consulted the Comptroller of the Treasury and he said, "You are not authorized by law to do that." There is a great growth in meat producing in the United States, and farmers are turning their attention more and more to the production of meat, for the reason that they can maintain the farm better by keeping domestic animals than any other way under the sun, and the necessity for inspection grows all the time with a growth and development of this business. And I would like to have the committee decide upon a policy whereby the necessities of the meat trade are to be properly met.

That would be entirely satisfactory to us. If they can not be, if Congress can not be induced to appropriate this money, the next best thing you can do for the American producer of meats is to let him pay the expense in getting his meat abroad, because it is a serious thing when there is a glut of products at home here in our yards and packing houses because it can not be inspected and sent out of the country.

Mr. HASKINS. Why should not the producer pay it?

Secretary WILSON. You would have to begin by levying it on the packer, and he would levy it back on the producer.

The CHAIRMAN. The question of whether Congress ought to appropriate this money has nothing to do with the justice or injustice of asking the packers to pay all or part of the cost. The question of appropriation has nothing to do with the question as I put it to you. That is another line of thought.

Secretary WILSON. You mean the abstract question of justice?

The CHAIRMAN. The question was whether, in your opinion, it would be just or unjust to charge the packers a portion or all of the inspection cost. Congress appropriating or not appropriating the money has nothing to do with it.

Secretary WILSON. That is an abstract psychological question that I may not be able to answer. There are two parties interested. There are the people who produce the meat and the people who consume it.

At present Congress is taking care of the health of the American people by having inspection of meats that enter into interstate commerce. Whether the expense for the conservation of public health

should all be put on the man who produces the meat is a question which I am not prepared to answer, but it is impossible to make a statement without speaking of Congress, and if the law-making power does not see fit to provide for it, it is much better to let the producer provide for it than to have a glut of meat at home when it is wanted abroad. I suppose it is more a question of public policy than an abstract question of justice.

The CHAIRMAN. There has not been any trouble up to this moment about the export of meat being inspected, and you told me that the only serious complaint was from the smaller men?

Secretary WILSON. Some of them have 12 microscopic inspectors, and they ask for 35.

The CHAIRMAN. That is an emergency which exists just at this moment in view of the threatening position of Germany?

Secretary WILSON. I think that has something to do with it.

The CHAIRMAN. I never heard of any complaint from the exporters of this country.

Doctor MELVIN. Yes, sir; very frequently.

The CHAIRMAN. They complain about everything. How much justice is there in the complaint? We all complain in this world that everything is against us.

Doctor MELVIN. They say that they could make more sales. When I was in charge of the meat inspection at Chicago the packers frequently told me of the different sales they had lost on account of not being able to fill them.

The CHAIRMAN. It may have been for something else. They are always finding fault with everything. That is human nature. I say, with a great deal of faith, that there is very little trouble along those lines.

Secretary WILSON. Heretofore, when we found an emergency of the kind we have now, we came to you and got the money. You now have a law which prohibits that.

The CHAIRMAN. I have talked with these gentlemen very many times on that subject, and they have had some complaints, but not many.

Secretary WILSON. What gentlemen?

The CHAIRMAN. Two or three of the big packers. They never had any trouble. They do not complain. I never talked with the smaller ones. I understood from the Secretary it was the smaller men who were complaining now.

Mr. CANDLER. Is this inspection required only for the export trade?

Doctor MELVIN. No, sir.

The CHAIRMAN. The microscopic inspection is 80 per cent of the cost?

Doctor MELVIN. Of all cost. Our home products require this inspection.

Secretary WILSON. Practically all of Europe requires it. The British Government does not.

Mr. CANDLER. Would there be any difficulty in having the inspection if the packers were required to pay for it?

Secretary WILSON. I do not think they would cheerfully pay.

The CHAIRMAN. We never pay anything cheerfully.

Mr. CANDLER. I understood you to say, Mr. Secretary, that one packer said he would be glad to pay for the inspection.

Secretary WILSON. One of the packers said so.

The CHAIRMAN. That was probably an exceptional case.

Mr. CANDLER. He claimed that some sales were being held up because the inspection could not be made?

Secretary WILSON. That is the point.

Mr. LEVER. If the packer is made to pay he will charge the cost up to the producer?

Secretary WILSON. Undoubtedly; the packer is not in business for his health.

Mr. SCOTT. Would it not be a pretty hard thing to charge up a cost of 2½ cents on an animal?

Secretary WILSON. To make it easy they would probably call it 10 cents.

Mr. HASKINS. So far as conserving the public health of this country is concerned, there is reason why we should bear the expense, but how about enabling the packers to market their products abroad; should the Government do that?

Secretary WILSON. Generally speaking, the United States of America should encourage the foreign trade. I really think it should.

Mr. HASKINS. Should encourage it, but they have it anyway.

Secretary WILSON. The theory has been, as I understand, of this committee in the past years—this matter has been discussed before—and the theory has been that it was wise for the Government to keep control of these things. If you withdraw everything along these lines there might be very little suspicion about our meats abroad and at home, but there might be a good deal of cause for suspicion.

The CHAIRMAN. If the United States paid 50 or 25 per cent of the inspection demanded by the large and small packers, the large packers would then suffer as well as the smaller ones?

Doctor MELVIN. Well, the small packers do not export directly. There is quite a considerable percentage of their products which is exported through the larger packers to whom they sell.

Mr. SCOTT. It seems to me the most important question, or a very important question to consider in this connection, is whether, if our system were changed so as to require the salaries of the inspectors to be paid by the packers suspicion might not be thrown around the whole system—if foreign buyers understood that these men who passed upon the carcasses were getting their salaries from the packers.

The CHAIRMAN. That would not be. We would make the direct appropriation and turn the receipts into the Treasury. We would charge so much a head and would turn the receipts into the general fund of the Treasury. The appropriations so far as the agricultural bill is concerned would be practically the same.

Mr. SCOTT. You simply recover by means of fees?

The CHAIRMAN. Yes, sir; and it would be paid into the Treasury.

Mr. Secretary, you have not expressed your opinion on the justice or injustice of the proposition. You say if Congress does not appropriate, we had better make the packers pay.

Secretary WILSON. That is the practical question, and we are practical people at the Agricultural Department.

Mr. LEVER. I think the question of justice or injustice would be a question for the committee to decide.

Secretary WILSON. I think after the producer has produced the animal the consumer is interested in this matter. Whether he can

very well afford to bear part of the expense of the inspection that would not be a very serious matter one way or the other. It will be levied upon the people who produce the stock. It would not be a very serious matter, but it is very important that the world should know of the character of our meats that go abroad.

Mr. LORIMER. A considerable portion of the cost of this inspection is for the inspection of interstate commerce, or for meat that is handled in interstate commerce, and that is for the benefit of the health of the people of this country?

Secretary WILSON. That is right.

The CHAIRMAN. What have you to say about the vast quantity of stuff that is eaten without any inspection at all?

Secretary WILSON. I have only this to say: That it is the duty of the Government to do as much as it can to conserve the health of the people, and that it ought to go as far as it can.

Mr. COCKS. These things all have the antemortem examination?

Doctor MELVIN. Yes, sir.

Mr. COCKS. Then it is up to the State or city to make it further, if it is not the province of the Government. The Government has done all it could, and it is the duty of the State to carry out the protection of its people.

Secretary WILSON. You would find a great deal of difficulty in securing people who could detect the diseases. The microscopical inspection is one requiring a scientific training to prepare people to perform.

Doctor MELVIN. The objection you mention practically obtains to-day. For instance, we have no inspectors in either Rochester or Syracuse. The slaughterers there have rather a limited trade.

The CHAIRMAN. Is it not local entirely?

Doctor MELVIN. Yes, sir; within a county or two. Then we get to such cities as Buffalo, New York, and Brooklyn. There you find slaughterers who not only kill live stock for the immediate vicinity, but also ship it into other States and abroad. Those are the places that we confine our inspection to.

These smaller establishments increase their business, they grow with the natural business of the country, and they reach a stage finally where they want to ship a part of their product, which they can sell to a good advantage to these exporters, and then they come to us for inspection in order that they may extend their trade. On account of our appropriation being limited it is often impossible to do so. We have to-day applications from eighteen different concerns who wish to have our inspection.

Secretary WILSON. They are not all small, either?

Doctor MELVIN. No, sir; not very. A business which would require an investment of \$100,000 or \$200,000.

The CHAIRMAN. I have thought a great deal over this subject. I have a general idea without being very absolutely positive about it, that if we can have a rigid ante-mortem examination, which I consider really, as far as the cattle and sheep are concerned, the great safeguard, and then offer the post-mortem inspection at cost or half cost, I think it is all the Government is really justified in doing or could be asked to do. Then, give it to everybody who asks for it, at cost or half cost. I felt that would cover the ground.

Secretary WILSON. It is much better to do that than to let it alone like it is now.

Mr. HAUGEN. How much of an increase will you need for next year to carry out the work successfully?

Doctor MELVIN. You mean of the total amount for the Bureau?

Mr. HAUGEN. Yes, sir; for the Bureau to carry on this inspection?

Doctor MELVIN. We have only estimated on \$840,000 against \$827,000 last year.

Mr. HAUGEN. Are you not asking for an appropriation now in the deficiency bill?

Doctor MELVIN. Yes, sir.

Mr. HAUGEN. An appropriation of about \$130,000?

Doctor MELVIN. \$135,000.

Mr. HAUGEN. How can you expect to get along if you only ask for an increase of \$13,000 over last year?

Doctor MELVIN. We actually have \$88,000 less for the work of the Bureau this year than last year and it has been absolutely impossible up to the present time to make any extension whatever in our expenditures.

The CHAIRMAN. How do you figure that? There was an increase given you this year over last year. We gave you more for the year ending June 30, 1906, than for 1905?

Doctor MELVIN. For the past fiscal year we had in the regular appropriation \$1,250,000, in the deficiency bill \$150,000, and then there was a balance of an emergency appropriation of \$120,033, making a total of \$1,520,033 for last year, the year ending June 30, 1905. For this year, the amount of our appropriations all told was \$1,431,520, or a difference of \$88,513 more last year than this year.

The CHAIRMAN. Last year we gave you \$1,456,520 and this year your estimate is \$1,729,000, an increase of \$273,000.

Doctor MELVIN. That does not include the statutory salaries.

The CHAIRMAN. I am speaking of the Bureau itself.

Doctor MELVIN. Yes, sir.

The CHAIRMAN. I think almost every year we have given you an increase. What is the \$120,000?

Doctor MELVIN. For the foot-and-mouth disease. The work was carried on with that amount included.

The CHAIRMAN. That was just \$120,000 additional, because you had no use for the \$120,000 in the foot-and-mouth disease. So it was an absolute increase?

Doctor MELVIN. It was an increase. For the year we had \$88,000 more than this year.

The CHAIRMAN. The \$120,000 was intended as an emergency appropriation. It was not supposed that you would need every dollar of it.

Doctor MELVIN. It was all used in our regular work.

The CHAIRMAN. The appropriation we gave you in 1904 was \$120,000 and \$50,000 more. In 1905 we raised that \$50,000, besides making the \$120,000 appropriation, and you again asked for \$150,000 in the deficiency, which you got.

Doctor MELVIN. Yes, sir. Then the aggregate of that is \$88,000 more than we got this year.

I might say, in this connection, that the eradication of the sheep scab, that is the sanitary work, in my opinion, is most necessary for

the good of the country, and then the microscopic inspection is very important.

Mr. HAUGEN. I suggest that we hear the gentleman on the \$135,000 deficiency.

Secretary WILSON. We have been heard by the Committee on Appropriations, and the hearing has been published.

Thereupon the committee adjourned to meet Monday, January 22, 1906.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Monday, January 22, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

The CHAIRMAN. We have Professor Galloway, Chief of the Bureau of Plant Industry, before us to-day. If you will look at page 7 of the estimates you will find that the Department suggests numerous changes there in the statutory roll, the employment of some new people, and doing away with other positions; quite a shifting about in the statutory roll there.

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. I see in a note on page 15 you give a general résumé of the changes proposed by the Department. Commencing with the editor, at \$2,000; what is the need of that? Who has done that work heretofore and who is to do it now if we give you this editor? That is an increase, but the rest is a matter of rearrangement largely.

Mr. GALLOWAY. Yes, sir; this is an increase. It is a change from \$1,800 to \$2,000.

The CHAIRMAN. What was this man classed as before; a clerk?

Mr. GALLOWAY. He was one of the clerks. That is the fourth item on page 7. We leave one off. That is an actual increase of salary—\$200 for the editor.

Mr. SCOTT. How long has the present incumbent been doing that work?

Mr. GALLOWAY. About five years.

The CHAIRMAN. At what salary?

Mr. GALLOWAY. He came in first at \$1,600, and was promoted to \$1,800, and we recommend this year that he be given \$2,000, for the reason that the other editors are drawing \$2,000, and he, as the editor of this Bureau, has about double the work of any other editor in the Department.

The CHAIRMAN. That is a better reason than the first one. The first reason does not amount to much.

Mr. GALLOWAY. Yes, sir. The Bureau of Plant Industry prepares 46 per cent of all farmers' bulletins that are published.

The CHAIRMAN. It gets them out?

Mr. GALLOWAY. Yes, sir; it prepares them or provides them. It produces 39 per cent of all the Yearbook papers and publishes 20 per cent of all other bulletins of the Department. Of all the publications of the Department, the Bureau of Plant Industry publishes 30 per cent. All that work falls on this one man, and he has no regular

assistant. He is doing the work and doing it well. That is the chief reason that he should have this increase. We believe it is due to him on the ground that he is doing as much if not more work than the other bureau editors and on the ground that the salary is not more than is being paid to other men who are doing the same kind of work.

The CHAIRMAN. Is he doing any work outside for magazines or papers?

Mr. GALLOWAY. No, sir.

Mr. SCOTT. His editorial work is strictly revisionary and revisory; he simply prepares the copy for the paper, and gets it in shape.

Mr. GALLOWAY. He attends to all the dress of our papers. Everything must go through a certain stereotyped form before it goes to the Government Printing Office. Of course the question of illustrations and economizing on illustrations is all handled by him, and I have found him very reliable and very accurate.

Mr. SCOTT. He does not do any original writing?

Mr. GALLOWAY. No, sir.

Mr. SCOTT. If he is the right man for the place he can earn his \$2,000 very easily.

The CHAIRMAN. You have mentioned illustrations. Two or three years ago there was a tendency to run to extremes in illustrations. Are you curbing that?

Mr. GALLOWAY. Yes, sir, materially; and I think that the tendency is steadily in that direction. I know it is in the Bureau of Plant Industry, and I think it is in the other bureaus. Mr. Rockwell's effort has been in the direction of curtailing illustrations, and where he can use three or four full-sized plates to double up, it is done. He saves money in that way, and by eliminating some of the illustrations saves more. I think it can be safely said that, taking the Department as a whole, 10 to 20 per cent of the illustrations submitted and 10 to 20 per cent of actual reading matter could be eliminated.

The CHAIRMAN. There is no doubt about that.

Mr. GALLOWAY. I understand that the President has appointed a committee to take the matter under consideration. Each department will have a committee to consider the matter of publications. Heretofore each chief of a bureau has necessarily looked after these matters, taking them up to the Secretary, who must pass on them individually.

The CHAIRMAN. The rest of these changes in here are suggested as being needed by you. From what point of view are they needed?

Mr. GALLOWAY. I would state that quite a number of the changes have been brought about by the general overhauling and shifting that took place last year. We are just getting things adjusted. As was the practice in former years, it was within the authority of the Secretary to make promotions during the year of clerks. That, of course, was stopped by your action last year.

The CHAIRMAN. Yes.

Mr. GALLOWAY. So that all that the Bureau of Plant Industry has recommended for clerks is set forth here. And where there are about 500 employees, we think that this does not represent a large number. If you will turn to page 11, the last item on that page, you will see it provides for "13 clerks, class 2 (increase of 1 submitted.)" That is an increase of 1 clerk to \$1,400. That is a promotion of a clerk at \$1,200 to \$1,400.

Mr. HENRY. That is simply a promotion?

Mr. GALLOWAY. Yes, sir.

Mr. SCOTT. Above there you submit a decrease of one.

The CHAIRMAN. That is the editor, taken out from that class and promoted to \$2,000.

Mr. GALLOWAY. Yes, sir. Now, this is an increase from \$1,200 to \$1,400. That position is filled by an efficient clerk and stenographer, a Mrs. Kinney, who has been in the office of the pathologist for five years.

The CHAIRMAN. How many promotions has she had during that time?

Mr. GALLOWAY. She came in at \$1,000.

Mr. WOODS. She is getting \$1,200 now?

The CHAIRMAN. Does she do any scientific work?

Mr. WOODS. No, sir; her work is purely clerical.

The CHAIRMAN. Do you not think that \$1,200 is a pretty good price for a stenographer?

Mr. GALLOWAY. Twelve hundred dollars is a good price for some stenographers, but this clerk is very efficient.

The CHAIRMAN. Compare that with the general prices paid stenographers in business establishments.

Mr. GALLOWAY. There are many stenographers in private business that are drawing a good deal less than that.

Mr. SCOTT. In what item does she appear?

Mr. GALLOWAY. She appears as one of the 13 clerks of class two. Further on there will be a decrease in that item.

Mr. HASKINS. Does this stenographer do any other work?

Mr. GALLOWAY. Yes, sir; some administrative work. In the absence of the gentleman who has charge of all our cereal work she looks after the office and looks after the routine correspondence.

Mr. CANDLER. What is the increase in her salary?

Mr. GALLOWAY. Two hundred dollars.

The CHAIRMAN. On page 12, the item at the top of the page, "26 clerks, class one," shows a decrease of one submitted.

Mr. GALLOWAY. That is because of her promotion.

The CHAIRMAN. Then, I see the item, "Fifteen clerks, at \$1,000 each (increase of one submitted)." What is the reason of that increase of one at the thousand-dollar rate?

Mr. GALLOWAY. This is the same sort of a case, except that in this instance it is not a question of a clerk, but a librarian—one who has charge of the sublibrary in vegetable pathology.

The CHAIRMAN. Is that sublibrary composed of books charged to the main library?

Mr. GALLOWAY. Yes, sir; all under the same system and all charged to the main library. The different bureaus of the Department are in separate buildings, a quarter of a mile apart, and the library is really a working collection of books.

The CHAIRMAN. How many books have you, in your sublibrary, drawn away from the main library?

Mr. GALLOWAY. For vegetable pathology and physiology, about how many are there, Mr. Woods?

Mr. WOODS. About 3,000.

The CHAIRMAN. The reason I ask is that they are asking for an increase of clerks in the library on account of the increased care of

the books, and if in each of your bureaus you have the books you need under a separate library, I do not see the need for an increased library force.

Mr. GALLOWAY. All those books go first to the main library, and there is a constant interchange from the main library and to the other libraries—back and forth. For instance, take the Forest Service, on F street. They may want some books we have in the library of vegetable pathology; and we must keep systematic control of those books.

Mr. SCOTT. How long has this librarian been there?

Mr. GALLOWAY. How long is it, Mr. Woods?

Mr. WOODS. A little over a year with us, and in the Bureau of Animal Industry before she came to us, as assistant in the library.

Mr. SCOTT. She came to you at \$900?

Mr. WOODS. She came at a thousand dollars a year.

Mr. SCOTT. I thought that you asked for her admission to the thousand dollar class now, as one additional clerk?

Mr. GALLOWAY. No, we ask for an increase from a thousand dollars to \$1,200.

Mr. SCOTT. Does she come in in this item of 15 one-thousand-dollar clerks?

Mr. GALLOWAY. No, sir; I have that wrong. This promotion is from \$840 to \$1,000.

The CHAIRMAN. That is an increase in the pay of a woman clerk?

Mr. GALLOWAY. Yes, sir. That is not the librarian at all. We have provided for that.

Mr. WOODS. I think the librarian has been already provided for by a separate provision of \$1,200 now, and this is Davenport in Doctor Webber's laboratory.

The CHAIRMAN. This increase, then, is what?

Mr. WOODS. From \$840 to \$1,000.

The CHAIRMAN. This is a man, then. Is he as good a stenographer as Mrs. Kinney?

Mr. WOODS. No, sir; he is not.

The CHAIRMAN. How long has he been in there?

Mr. WOODS. He is a fair stenographer, but with nothing like the ability of Mrs. Kinney. She is very rapid and very accurate.

The CHAIRMAN. Did he come in through the civil service?

Mr. WOODS. Yes, sir.

Mr. SCOTT. He is now getting \$840?

Mr. WOODS. This can be cut out, because he was promoted just a few days ago, in the shifting of the general statutory roll.

Mr. GALLOWAY. There are from time to time resignations and changes in our statutory roll, and of course in these cases where we have people in the lower grades we put them up, and in this particular case Mr. Woods says that Mr. Davenport was raised from the \$840 grade to a \$1,000 position by virtue of the resignation from a statutory place of another clerk, so that place can be omitted.

Mr. WOODS. One of our stenographers is also going to resign in about two weeks and we will put Mrs. Kinney in his place, so her promotion need not be allowed.

Mr. SCOTT. That makes, then, 14 clerks instead of 15, at \$1,000 each.

The CHAIRMAN. What did you say about Mrs. Kinney?

Mr. GALLOWAY. There is to be another vacancy on the statutory

roll in about two weeks, which will make vacant a \$1,400 place, and Mrs. Kinney being in the line of promotion would naturally go in that place, and that would make it unnecessary to act on this item.

Mr. SCOTT. That will make it unnecessary to act on either of these increases, will it not?

Mr. GALLOWAY. Yes, sir; it is unnecessary to act on either case, that of Mrs. Kinney or Mr. Davenport.

Mr. SCOTT. So that we can leave this other item here, 12 clerks, on page 11, instead of 13.

Mr. GALLOWAY. Twelve clerks on page 11, at the bottom of the page, instead of 13.

Mr. SCOTT. That leaves 13 instead of 14, on page 12, also?

Mr. GALLOWAY. On the other hand, if that is done on the next page, if one decrease is allowed there, we will be short one.

Mr. SCOTT. Then we will have to make 27 in that class?

Mr. GALLOWAY. Yes, sir. There will not be any increase in the salaries. It will leave the thing practically as it is now.

The CHAIRMAN. Is there not a flow of promotion right along now without any special alteration each year of the statutory roll?

Mr. GALLOWAY. There is; yes, sir, to a certain extent.

The CHAIRMAN. Or is there not a promotion caused by resignation, or death, or dismissal?

Mr. GALLOWAY. There is a promotion, but we have found in this last year, when we made these estimates up in September, it looked as though we were not going to provide for some very deserving cases; but these changes have come up since the estimates were made. The resignation of a \$1,400 clerk is expected in about two weeks. A man went to the law department, and left a \$1,200 place vacant.

The CHAIRMAN. What Department? The Department of Justice or the Department of Agriculture?

Mr. GALLOWAY. The Department of Agriculture.

The CHAIRMAN. That is on the Secretary's roll?

Mr. GALLOWAY. It is provided for on the Secretary's list.

Mr. SCOTT. Further down you have one clerk provided for at \$1,200, submitted. What is the occasion for that?

The CHAIRMAN. Before you leave the editor, my attention has been called to the fact that under the Bureau of Publications we pay \$24,150 for editorial work.

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. Why is not the editorial work of your Bureau done by the Bureau of Publications?

Mr. GALLOWAY. It would be very difficult for the editorial work to be all done in one office. The same difficulties would arise if we should attempt to do all the stenographic and typewriting work in one office. It is a question of decentralization, so to speak. We must have the man who handles our accounts and our publications directly at our elbow or we can not get our work done. The Division of Publications asked for enough to do the work that is right in its own office.

The CHAIRMAN. Each bureau does its own editorial work and sends its work in to the Bureau of Publications only to be published?

Mr. GALLOWAY. The Bureau of Plant Industry and the Bureau of Animal Industry and the Forest Service, I believe, are the only ones that do their own editorial work.

The CHAIRMAN. If you do the work on 40 per cent of the bulletins which are sent out, you are doing pretty nearly half, right at once, of the editorial work?

Mr. GALLOWAY. Nearly all the farmers' bulletins originate in the Division of Publications, and all of the publications of the Department must go through that division. The Yearbook is entirely handled by the Bureau of Publications.

The CHAIRMAN. Yes, I understand that.

Mr. GALLOWAY. And not only that, but all the circulars of the Department are handled in that division.

The CHAIRMAN. But, notwithstanding what you have said is true, that 46 per cent of the Farmers' bulletins emanate from your Bureau?

Mr. GALLOWAY. Yes, sir; 46 per cent.

The CHAIRMAN. And are edited by your editors before they are sent to the Bureau of Publications. That is correct?

Mr. GALLOWAY. Yes, sir; that is correct.

The CHAIRMAN. The next increase is a new clerk, submitted, at \$800. That is on page 12.

Mr. GALLOWAY. That is for a promotion in the case of one clerk from \$660 to \$800 per annum.

The CHAIRMAN. Would it not be from \$720?

Mr. GALLOWAY. \$660 she is getting now.

The CHAIRMAN. It is \$660 to \$800 per annum?

Mr. GALLOWAY. Yes, sir.

Mr. SCOTT. What does she do?

Mr. GALLOWAY. She is an assistant in the office of Professor Spillman, in charge of farm management.

Mr. SCOTT. How long has she been there on that salary?

Mr. GALLOWAY. About five years, in that office. She came there as an ordinary laborer under the old régime.

The CHAIRMAN. She was appointed how, by a Congressman?

Mr. GALLOWAY. By a former member of this committee. He came from Kentucky. Mr. Trimble represents his district now.

Mr. HENRY. Was she one of those who was left outside the breast-works?

Mr. GALLOWAY. She was brought in under the last civil-service order and took an examination and passed.

Mr. SCOTT. If she has been there five years at \$660 she should be either discharged or promoted.

Mr. GALLOWAY. She is a good clerk.

The CHAIRMAN. Why did you not promote her to \$720? You have 11 clerks at \$720. You are jumping her over the heads of those at \$720.

Mr. GALLOWAY. Eight hundred dollars is really about the lowest class for a good clerk, and she has had no promotion in the whole time that she has been there.

The CHAIRMAN. How about those 11 clerks at \$720? You do not disturb them?

Mr. GALLOWAY. I think most of those \$720 clerks, or in fact all of them, are those who are not eligible for appointment by examination. They were brought in by a blanket order, and have not taken the promotion examination ordered by the Civil Service.

The CHAIRMAN. The next below there is "Three clerks at \$660 each

(decrease of one submitted).” She is taken out of there and put up to \$800?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. The next below is an increase of \$180 for a “photographer or clerk?”

Mr. GALLOWAY. Yes, sir. Mr. Chairman, that increase is for a photographer who is in the office of farm management, and he has been in the Department about six or seven years.

The CHAIRMAN. This is the natural increase of a salary in a statutory place?

Mr. GALLOWAY. It is an increase in a statutory place.

The CHAIRMAN. An increase in a statutory salary?

Mr. GALLOWAY. An increase in a statutory salary; yes, sir. But he was one of the men who has been on the rolls as a laborer, but is now eligible to promotion by reason of civil service rules. He has been doing photographic work, and has been doing it for sometime, although on the rolls as a laborer.

The CHAIRMAN. He is eligible to a position as a result of the President's order?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. You say his salary has been \$660?

Mr. GALLOWAY. Six hundred and sixty dollars; yes, sir; all the time. I may say in this connection that photography is, of course, one of the things that we use a great deal now in our work, and we are using it more and more, now, in lieu of written notes for record making, and this man has charge of the entire photographic work of the office, which uses photography a great deal in its fieldwork.

The general question of farm management and the handling of crops, the construction of barns, buildings, and silos, and things of that kind, are all illustrated in our notes by photography, and when these negatives come in the photographer takes these negatives and files them and takes charge of them, so that we can have access to them at any time in our work.

The CHAIRMAN. Nine hundred dollars does not seem excessive for a competent man of that class.

The next increase is “one illustrator (\$180 additional submitted).” That is an increase of a statutory salary?

Mr. GALLOWAY. That has been provided for within the last three or four days?

The CHAIRMAN. How?

Mr. GALLOWAY. By a vacancy on the roll. One of the assistants, a woman, has just gotten married, and that made a vacancy, to which this clerk was promoted.

Mr. SCOTT. We can strike out that entire item?

Mr. GALLOWAY. You can leave it at the same salary, because that is \$720. We will have to fill that from the civil service. We have not filled it as yet.

The CHAIRMAN. Why not transfer that up above there and add it to those 11 clerks at \$720 each, so as to give 12 of that class?

Mr. GALLOWAY. That would be the same thing. This is an illustrator and not a clerk, however. We had a mix up with the Civil Service Commission once about such a question.

The CHAIRMAN. You can make it “illustrator or clerk?”

Mr. GALLOWAY. Yes; illustrator or clerk, and that will enable us to use it either way.

The CHAIRMAN. "One clerk who shall be an illustrator?"

Mr. GALLOWAY. Or clerk.

Mr. HASKINS. I would make it "illustrator and clerk."

Mr. GALLOWAY. Well, "and clerk."

The CHAIRMAN. The next change is "one carpenter (\$280 additional submitted)." That makes his salary \$1,000. He had \$720 before?

Mr. GALLOWAY. Yes, sir.

That is a position that has been filled very acceptably by one man for the past six or seven years, who can probably make \$4 or \$5 or \$6 a day outside. I used as an argument a while ago in the case of another increase the fact that other employees in the Department were getting what we were asking for that employee. I will not make that same argument in this case, however. This man does repairs and construction on all our greenhouses, and we now have more than an acre of glass. He also does all the miscellaneous work in connection with refitting and reshaping in our laboratories, and fixing cabinets, and things of that kind.

The CHAIRMAN. He had \$720 before?

Mr. GALLOWAY. Yes, sir; we have an \$840 carpenter now.

Mr. HENRY. You jump this man over him?

Mr. GALLOWAY. He has been there a great deal longer.

Mr. HENRY. The \$720 man is the best man?

Mr. GALLOWAY. Yes, sir; the \$720 man is; and this man is just now eligible through the civil service, and we could not displace the other man to put this man in.

The CHAIRMAN. Now, there you are establishing a statutory place at \$1,000. It strikes me that is pretty high for a carpenter.

Mr. HASKINS. It is only \$3 a day.

The CHAIRMAN. I know, but that is for every day in the year. My point is that you are making it a statutory place, and the next man that comes in there may not be worth that.

Mr. GALLOWAY. Of course all these arguments were advanced last winter when the question of fixing these statutory places was brought up. This man may step out, as you say, and we might want to put another carpenter in there, and if it were not for this provision we could put him in at \$720. But we have to consider this individual case. When these salaries were paid from a lump sum it was possible for this man to step out at \$1,000, and we could put a \$720 man in, and use the rest of the money for something else.

Mr. SCOTT. Why should you not do it this way. When this man goes out, and you want to put a \$720 man in this place, why can not you let this estimate here show one carpenter—

Mr. GALLOWAY. At \$720, in lieu of \$1,000?

Mr. SCOTT. Make it an additional estimate submitted, \$720, in lieu of the one at \$1,000.

Mr. GALLOWAY. That can be done all along the line, where we have such changes.

Mr. SCOTT. Just as you are here separating decrease and increase at different salaries. That could be done at the end of each Congressional or fiscal year.

Mr. GALLOWAY. Yes, sir; but in the meantime conditions would be still the same. I am frank to say that I believe that the action that was taken by the committee last year has been for the best interest of the service in fixing these statutory places.

Mr. SCOTT. You have not found it an embarrassment?

Mr. GALLOWAY. Not at all.

Mr. SCOTT. And have you had any cases in which you have been required by the statute to pay a higher salary than you would have paid if you had been directing it out of a lump roll, as you did before?

Mr. GALLOWAY. I do not recollect any. Do you, Mr. Woods?

Mr. WOODS. I think not.

Mr. GALLOWAY. Of course we were fortunate in some respects, in reference to the scientific places. There was one three thousand-dollar place which was simply broken up. How are we using that now, Mr. Woods?

Mr. WOODS. It is converted to the nitrogen work.

Mr. GALLOWAY. That has gone into the salary of one of the experts, who is getting \$3,000 a year?

The CHAIRMAN. The next change is in the item, "Two gardeners or assistants, at \$1,000 each (increase of one submitted)." What is the reason of that?

Mr. GALLOWAY. This is a transfer from pathology to gardens and grounds. This provides for a gardener, who is now—

The CHAIRMAN. You decrease the \$600 class. Further down you see "Two gardeners, at \$660 each (decrease of one submitted)." Have you not taken that man and put him into the \$780 class, and the \$780 man into the \$1,000 class?

Mr. GALLOWAY. No, Mr. Chairman. This item, "Two gardeners or assistants, at \$1,000 each (increase of one submitted)," is for the salary of one man who has been carried in the Bureau of Vegetable Pathology, and that place is now made statutory.

The CHAIRMAN. Is he a scientist?

Mr. GALLOWAY. No, sir; he is a gardener. He was put on there because we employed him in the interim.

The CHAIRMAN. You see my point, I have no doubt. You decrease the number of clerks at \$660, but you have taken one of them and increased him to \$780, and the \$780 man to \$1,000.

Mr. GALLOWAY. There was one already at \$1,000, and we made it two.

The CHAIRMAN. He is on the lump-sum roll, you say?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. How was he allowed to remain there last year?

Mr. GALLOWAY. He was not on there last year.

Mr. SCOTT. Then how did he get on?

The CHAIRMAN. How long has he been there?

Mr. WOODS. Two years.

Mr. GALLOWAY. Then he got left in the shuffle when we made these general transfers.

Mr. LAMB. What has become of those people that got left in that way?

Mr. GALLOWAY. They were taken care of in the lump sum. You will find some of them all the way through here. In regard to all the

6,000 or 7,000 names that we had to consider last year, we had to depend on the records from the other offices, and some of them did not come in.

The CHAIRMAN. What is that man doing?

Mr. WOODS. He is in charge of the pathological and physiological greenhouses needed in connection with our laboratory work.

Mr. GALLOWAY. A sort of a plant hospital.

The CHAIRMAN. What does the other gardener do?

Mr. GALLOWAY. He is in charge of some other greenhouses for the tropical plants and others that we bring in through our introduction work.

Mr. SCOTT. Can this man be classed as a scientist?

Mr. GALLOWAY. No, sir; these men are professional men—gardeners.

Mr. SCOTT. The mere fact that they are in charge of your pathological greenhouse and your physiological greenhouse does not necessitate any very great degree of learning on their part?

Mr. GALLOWAY. No, sir.

The CHAIRMAN. What does he do—is he simply a laborer?

Mr. GALLOWAY. We have two houses 135 feet long and 20 feet wide, and in those houses are probably 40 or 50 different kinds of experimental work going on, conducted by the scientific corps. As an illustration, we have in one house now a test going on of a new fertilizer for tobacco. The potash which is used in the Connecticut valley sells for about \$98 a ton. Recently Doctor Cushman, of the office of roads, has found that a certain preparation of feldspar rock, which costs only \$8 or \$9 a ton, may give as good results, when ground and properly prepared, as potash.

Mr. HENRY. Is that a sulphite?

Mr. GALLOWAY. No, sir.

Mr. HENRY. What is it?

Mr. GALLOWAY. A carbonate. One-half of one of those houses has now been devoted to a test of the carbonate of potash, compared with nothing, and compared with this feldspar preparation discovered by Doctor Cushman. His discovery was that in grinding up his road material he found that by certain processes of drying the potash was liberated through the disintegration and breaking up of the rock. And that is a very fortunate discovery, because feldspar rock is very abundant everywhere.

Mr. HENRY. Where is it found?

Mr. GALLOWAY. It is found in Connecticut and elsewhere very widely distributed. This feldspar is used by a certain firm in Philadelphia, which uses it for pottery work.

Mr. HENRY. Do you know its exact location?

Mr. GALLOWAY. No, sir.

Mr. HENRY. Do you know how high his percentage is?

Mr. GALLOWAY. I can not say definitely—10 to 20 per cent.

Mr. HENRY. Of actual potash?

Mr. GALLOWAY. Yes, sir; the interesting fact is that plants will respond very quickly when fertilized with this material.

Mr. HENRY. When was this discovery made?

Mr. GALLOWAY. Some time last summer.

Mr. HENRY. Then we have had, right in our State, a carbonate of

potash that is, you believe, equally as good as the potash for which this high price has been paid?

Mr. GALLOWAY. We do not go as far as that yet. We are simply making experiments.

Mr. HENRY. Yes.

Mr. GALLOWAY. One of the things we are doing now is that we have laid out a plan of experiments in the Connecticut Valley, with Mr. Jenkins, where we are testing in the field what we are doing in the greenhouses in the winter. The man who is doing this work would not know sulphate of potash from muriate of potash, and he simply handles these plants under direction and does the work that is necessary.

The CHAIRMAN. The next change is, "Four gardeners, at \$780 each (increase of one submitted)." You have an increase of one there. What is the reason of that?

Mr. GALLOWAY. That is an increase of the salary of one man who has been there.

The CHAIRMAN. A \$660 man?

Mr. GALLOWAY. Yes, sir.

Mr. SCOTT. How long has he been there?

Mr. GALLOWAY. He was there before I had charge of that department at all—that is, the gardening end of it. He has been there ten years, or probably longer. He is in charge of our packing house; that is, of the packing of vines and shrubs—all the things that go out, especially the Congressional end of it.

The CHAIRMAN. The next is at the top of page 13: "Two plumbers, at \$900 each (\$180 each additional submitted)." On what do you base the increase of that salary? What use have you for plumbers—for your greenhouses?

Mr. GALLOWAY. For greenhouses, and laboratories, and miscellaneous work around the buildings. We have six or seven or eight buildings that we are running, and all are equipped with separate heating apparatus, and a greenhouse plant that covers nearly an acre of ground, which involves engineering and plumbing work constantly. Changes are being made, of course, where we want to conduct experimental work—constant changes; and the work at the Arlington farm is all included in this category. The salaries that we are asking for these men are just about what the plumbers secure as ordinary day's wages.

Mr. SCOTT. Do you keep two plumbers busy?

Mr. GALLOWAY. We certainly do, all the time.

The CHAIRMAN. How many buildings did you say you occupied; outside houses, buildings?

Mr. GALLOWAY. About nine, besides the greenhouses.

Mr. SCOTT. For the Bureau of Plant Industry alone?

Mr. GALLOWAY. We are occupying about 50,000 feet of floor space.

Mr. CANDLER. Do you know how many buildings are being rented by the whole Department?

The CHAIRMAN. He says nine, in addition to the greenhouses.

Mr. WOODS. Yes, sir.

Mr. GALLOWAY. In the whole Department I should say that we are renting 20 buildings. This has been growing very rapidly. I made an estimate of the floor space we were occupying, and it was less than

100,000 feet. Now, there are three bureaus which are occupying more than that—the Bureau of Animal Industry, the Bureau of Plant Industry, and the Forest Service.

The CHAIRMAN. That would indicate that the committee has been allowing the Department to grow, and quite rapidly?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. Are any of those quarters to be vacated?

Mr. GALLOWAY. No, sir. Part of them will be vacated when we get into the new laboratories, in the new buildings, which we hope will be in 1907. These two laboratories provide for 200,000 feet of floor space.

Mr. CANDLER. The rent of these buildings would amount to more than the Government would have to pay in the way of interest on the money to build new ones?

Mr. GALLOWAY. Yes, sir. Each of these buildings necessitates a special corps of watchmen, and firemen, also, and those expenses mount up to a considerable sum, of course.

The CHAIRMAN. The next is, "Three firemen, at \$720 each (increase of two submitted, in lieu of two firemen, at \$600, dropped)." Is not that an increase of statutory salary?

Mr. GALLOWAY. No, sir. Two firemen from \$600 to \$720. These men are night firemen.

The CHAIRMAN. That is, you drop two firemen, at \$600?

Mr. GALLOWAY. We add two firemen at \$720 and drop two at \$600.

The CHAIRMAN. That is an increase?

Mr. GALLOWAY. Yes, sir; it does cause an increase.

The CHAIRMAN. That is an increase on the statutory roll of so many.

Mr. GALLOWAY. Yes; we add two firemen at a higher salary, in lieu of two dropped at a lower salary.

The CHAIRMAN. As I understand it, when you get into the new building, you will do away with a lot of these firemen and watchmen, and messengers, etc.?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. That is one of the promises that you made to us, that you would need a much smaller number of these people when you get into the new building. Is it well to make this increase, in view of the fact that you will soon be in the new building?

Mr. GALLOWAY. I do not think it is.

Mr. SCOTT. These two firemen were on the statutory roll at \$600, were they not?

Mr. GALLOWAY. We put them on there by virtue of the general blanket order last winter.

Mr. SCOTT. And you are simply taking them up into the \$720 class now?

Mr. GALLOWAY. Yes, sir. In regard to these firemen and messengers and minor positions, things of that kind, it seems to me that it would be better to blanket in some way in a lump sum. Of course we can drop them if you desire to do so.

Mr. SCOTT. If these two men have been doing the work at \$600, is there any reason for giving them \$720?

Mr. GALLOWAY. None, except that they have been long in the service and have had no promotions.

Mr. SCOTT. What is the nature of the duty of these two men?

Mr. GALLOWAY. They are night watchmen of the greenhouses and do the night work. During the summer time they are gardeners, and take care of our beds and trees and things of that kind.

The CHAIRMAN. The next is "Two clerks or messengers, at \$840 (increase of one submitted)." What is the need for that?

Mr. GALLOWAY. There is an increase of one submitted. This is a man who has been in the Department for four years, and he has been doing something more than messenger work. He is really eligible to the grade as clerk, but he has been prevented from getting into a clerical position because of civil-service qualifications.

Mr. HENRY. Is he one of that class—

Mr. GALLOWAY. Yes, sir; he is one of that class that came in as laborers.

The CHAIRMAN. The next is "One skilled laborer," at \$720, and then comes "Two skilled laborers, at \$720 each." Those can be arranged in one item, can they not?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. What is the difference between a skilled laborer and a clerk at \$720? On page 12 there are 11 clerks, at \$720 each, and here is a provision for two skilled laborers, at \$720, and so forth.

Mr. GALLOWAY. Under the civil-service rules we can not put a skilled laborer at any clerical work. One under the clerical class can be put at almost anything in the way of clerical work, but under the civil-service rules we are prohibited from putting a skilled laborer at clerical duties, and we must report to the civil service every time we make any change in the duties of those employed.

The CHAIRMAN. What are the duties of these six skilled laborers, three at \$720 and three at \$660? What are those six skilled laborers doing?

Mr. GALLOWAY. Three or four of those men are engaged in work in connection with our seed work—simply handy men around the work. They come in in the handling of the seed and the handling of the elevators in the building where we are handling seed, and in the handling of furnaces, and—

The CHAIRMAN. You mean the germinating house furnaces?

Mr. GALLOWAY. No, sir; the heating furnace of the building.

The CHAIRMAN. They do not come under the "firemen?"

Mr. GALLOWAY. No, sir; not under the firemen. That is a very simple apparatus over there, and we do not class them as firemen.

The CHAIRMAN. Some of them get the same wages. Two of your firemen get \$720, and three of the skilled laborers get \$720.

Mr. GALLOWAY. The skilled laborer is a man who can be put at anything—any kind of skilled work with his hands; but if they use their heads—

The CHAIRMAN. I think everybody around this table knows what a handy man is. We know what a handy man is on the farm; he is a man that can do almost anything.

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. Are there any women among those employees?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. What do they do?

Mr. GALLOWAY. They, on occasion, will sew up bags on the machines, and things of that kind. These women will manipulate the apparatus or machinery that we use in connection with our frank

counting. They actually count the franks—the nine or ten million franks that we put through our mill down there every year.

Mr. LEVER. Those people are not under the civil service, are they?

Mr. GALLOWAY. Yes, sir; they are.

Mr. LAMB. They have to pass the physical board?

Mr. GALLOWAY. For the skilled laborers there is nothing but a physical examination and a certificate of character.

The CHAIRMAN. I notice the item of "Two clerks or messengers, at \$840 each (increase of one submitted)," and below that "One messenger," at \$660. How do you make that classification or distinction—two clerks or messengers at \$840?

Mr. GALLOWAY. Item three from the top of the page?

The CHAIRMAN. Yes.

Mr. GALLOWAY. That is the case to which we referred a moment ago, where the particular man is acting largely as a messenger, but occasionally as a clerk. It is a high grade of messenger work.

The CHAIRMAN. How does the civil service treat him?

Mr. GALLOWAY. The civil service will give him what we call a promotion examination whenever the Secretary asks for it, so that he will get into the low-grade class.

The CHAIRMAN. The next is "Six skilled laborers, at \$600 each (increase of one submitted, in lieu of one skilled laborer, at \$480, dropped)." Do you mean dropped by being promoted to \$600?

Mr. GALLOWAY. Dropped by being promoted. That is a promotion for a young man who has been in the Department for four years, and who is doing all sorts of things—painting and potting plants, and helping the plumbers when help is required. This is a boy I secured from the Junior Republic four or five years ago, and he is trying to make something out of himself.

The CHAIRMAN. Now, you want to start in another skilled laborer at \$720. You have not got a place for him on the roll?

Mr. GALLOWAY. No, sir; we could put him on the lump sum, and bring the matter to the attention of the committee next year.

The CHAIRMAN. How could you do that?

Mr. GALLOWAY. We would put him on as a new item. That is only in emergency.

The CHAIRMAN. Yes; but the lump fund, as we fixed it last year, is only supposed to cover scientists, is it not?

Mr. GALLOWAY. The understanding was that it should cover only scientists, but in case of emergencies the Secretary would have authority to appoint temporarily, and that appointment of course would be submitted to the committee for its approval or disapproval. We have quite a number of those cases coming before you.

The CHAIRMAN. I have not carried that in my mind. Where was that item put in the bill?

Mr. GALLOWAY. Right at the very end of the bill. There is a paragraph that provided for that.

The CHAIRMAN. There is a clause which reads as follows:

And the Secretary of Agriculture is hereby authorized to make such appointments, promotions, and changes in salaries, to be paid out of the lump funds of the several bureaus, divisions, and offices of the Department as may be for the best interests of the service: *Provided*, That the maximum salary of any classified scientific investigator in the city of Washington, or other employee engaged in scientific work, shall not exceed three thousand dollars per annum. And the

Secretary of Agriculture is hereby authorized and directed to pay the salary of each employee from the roll of the bureau, independent division, or office in which the employee is working, and no other: *Provided, however,* That details may be made from the office of the Secretary when necessary and the services of the person whom it is proposed to detail are not required in that office; and he is further authorized and directed to submit to Congress each year a statement covering all appointments, promotions, or other changes made in the salaries paid from lump funds, giving in each case the title, salary, and amount of such change or changes, together with reasons therefor.

Mr. GALLOWAY. Under that act, in case of emergency, the Secretary would have authority to appoint a clerk, but must report it in this statement to you, which, I think, he has already done.

The CHAIRMAN. The next is "three watchmen at \$720 each (increase of one submitted).?" Why do you want another watchman? That is a promotion, I see.

Mr. GALLOWAY. Yes, sir; that is a promotion.

The CHAIRMAN. Five skilled laborers at \$480. You do preserve some of them at \$480, I see. Why do you do that?

Mr. GALLOWAY. That is simply to give us opportunity for necessary additional work that we want to do. We could put it the other way, if you like, if the occasion arises to come in and bring it up before the committee.

Mr. SCOTT. It seems to me that is exactly what that paragraph was put in there to provide for, namely, contingencies. We can not very well provide for contingencies on the statutory roll.

The CHAIRMAN. No.

Mr. SCOTT. I would suggest that that be stricken out.

The CHAIRMAN. The next is "One messenger boy (decrease of two submitted)."

Mr. WOODS. That is a promotion of two messenger boys receiving \$300 each to \$480 each.

Mr. GALLOWAY. Just explain what those boys are doing.

Mr. WOODS. The civil service has urged us from time to time in starting people in a low grade of work to start with some of their low-grade messenger boys.

Mr. GALLOWAY. Boys from the high schools?

Mr. WOODS. Yes, sir; boys from the high schools. So that we have taken in boys that we want to make handy men about the laboratories in those low grades, and those that prove to be of some account we promote to the higher grades. But in these two cases we have had these boys very nearly two years at \$300 a year, and they can not take promotion examinations for about six months yet, and when they do take the examination there is no place to promote them.

The CHAIRMAN. To what salary would they be promoted if they took the examination?

Mr. GALLOWAY. \$480 if this provision is made.

The CHAIRMAN. If not, there would be no place for them. The Secretary has agreed with the committee not to make any promotions from the statutory roll to the lump sum.

Mr. GALLOWAY. I would like to emphasize that point right here. There have been a great many recommendations to promote a man by taking him from a statutory place and putting him on the lump sum and promoting him there, and it has been absolutely impossible since this last act.

Mr. SCOTT. I would like to ask if you have ever had the experience of finding a man on your statutory roll who did not make good and who has not done the work that was required of him?

Mr. GALLOWAY. Yes, sir.

Mr. SCOTT. What is done then?

Mr. GALLOWAY. He either resigns or goes out and goes to some other department.

Mr. SCOTT. You actually weed out that material, do you?

Mr. GALLOWAY. I have a man now who looks to me as if he would not make good, and he is on six months' probationary period, and we may send him back to the civil service, of course.

Mr. CANDLER. You can send him back and let the other fellows wrestle with him?

Mr. GALLOWAY. Yes, sir; we can let him go back. I suppose somebody else would get him. Of course, his record goes with him.

Mr. WOODS. I have had several of those. They get transfers to other departments, and if they do not they just wait for another job.

Mr. GALLOWAY. We had a case in which a stenographer came to us, and he did not make good, and we gave him a month to resign in, and he is out now. He got a transfer to another department at a lower salary.

The CHAIRMAN. Now, one question. How many absolute increases in the salaries of statutory places have you recommended—how many has the Department recommended? How many increases are there in the salaries of statutory places?

Mr. GALLOWAY. You mean in this Bureau?

The CHAIRMAN. Yes.

Mr. GALLOWAY. We have recommended twelve.

The CHAIRMAN. Twelve?

Mr. GALLOWAY. Cutting out the two that were dropped.

The CHAIRMAN. Will you please name them to the committee?

Mr. GALLOWAY. I have mine all numbered here.

Mr. COCKS. Does not this note on page 18 of the Book of Estimates give them?

Mr. GALLOWAY. It is very difficult to name them from that note, because they are lumped in there. The editor is the first one.

The CHAIRMAN. I mean where you increase. What was the statutory salary formerly? Did you catch my idea?

Mr. GALLOWAY. I catch it, all right. I have mine all numbered—the salaries right here—with a list of them and the names opposite them; but you can not follow this (if I should read it to you) in the Book of Estimates.

The CHAIRMAN. I want to follow it in the estimates.

Mr. GALLOWAY. The first is the editor, an increase of \$200.

Mr. SCOTT. That proposed increase from \$1,200 to \$1,400 was not an increase along the line suggested by the chairman. That was simply a promotion. You did have statutory places that pay \$1,400 a year, but you simply thought of promoting this lady into one of those places. But the editor does come under the chairman's question. The chairman wants to know what the actual increases of statutory places are?

Mr. GALLOWAY. I understand. The other two, as I understood it, were eliminated entirely—that is, the \$1,200 and the \$1,400 place. They go out.

Mr. SCOTT. But if you had increased there it would simply have been a promotion?

Mr. GALLOWAY. It would have been the location of the \$1,400 place.

Mr. SCOTT. I thought you had now some \$1,400 places.

Mr. GALLOWAY. We would not have to come before the committee to do that. That was done through the civil-service steps.

Mr. SCOTT. I misunderstood it. I thought you had a \$1,400 place and simply put this individual into it.

Mr. GALLOWAY. No, sir; and this was decided not to be necessary, because we had a place available by the resignation of a \$1,400 man.

Mr. GALLOWAY. The next is a clerk from \$660 to \$800.

The CHAIRMAN. What is that—in the bill?

Mr. SCOTT. You have plenty of clerks at \$800. Is not that simply a promotion?

Mr. GALLOWAY. That is what the chairman asked—what promotions we were recommending.

Mr. SCOTT. He is not asking for the promotions. He is asking to find out how many actual increases of salaries you are asking for. He wants you to give the increases, naming the cases.

The CHAIRMAN. That increase of salary is in the editor's work?

Mr. GALLOWAY. Yes, sir; the next one I had is this of Miss Tyler, from \$660 to \$800, an increase of \$140.

The CHAIRMAN. Page 12, one clerk at \$800. That man is taken from the \$660 list, right below him. The \$660 class is decreased one.

Mr. GALLOWAY. That will make an actual increase of \$140.

The CHAIRMAN. That is right.

Mr. GALLOWAY. Next is the photographer, from \$720 to \$900, an increase of \$180.

The CHAIRMAN. The next is the illustrator?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. That is taken out?

Mr. GALLOWAY. Yes, sir; and leaves that item at \$720.

The CHAIRMAN. The next is the carpenter, from \$720 to \$1,000?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. An actual increase of \$280.

Mr. GALLOWAY. The next is the gardeners, from \$660 to \$780. The next is 2 firemen from \$600 to \$720. The next is a messenger from \$720 to \$840. The next is skilled laborer, \$400 to \$600.

The CHAIRMAN. "Two clerks or messengers, at \$840 each (increase of 1 submitted)." Is that the item?

Mr. GALLOWAY. Yes, sir; the next is skilled laborer, \$480 to \$600. The next is watchman, \$600 to \$720. The next is two messenger boys, \$300 to \$480. It all makes an actual increase of \$4,200.

The CHAIRMAN. Does the committee want to ask any questions regarding the statutory roll? If not, we will pass to the next heading, "Vegetable, Pathological, and Physiological Investigations."

Mr. HASKINS. This is all the same as last year, I believe.

The CHAIRMAN. Let us take this up in order. Take first the clause "To investigate the diseases affecting citrus fruits, pineapples, and truck crops grown in the winter in the Southern States." What have you done along that line and what have you finished in that line? You know the old cry when you have asked increased appropriations, and you know that we always ask the question, "What have you

finished and why can not the money that has been heretofore appropriated on that work which is now finished be applied to new work?"

Mr. GALLOWAY. Yes, sir; that is exceedingly difficult to answer.

The CHAIRMAN. Take it along that line. Have you not completed some of that work?

Mr. GALLOWAY. It is an exceedingly difficult question to answer. It would be just as easy to answer the question "Why does not Congress finish up its work and go home?" Why does it come here year after year? The argument that holds good in one case holds good in the other. There are constantly new needs coming up.

The CHAIRMAN. But Congress gets through with one piece of legislation and that is the end of it.

Mr. GALLOWAY. We do get through with certain questions concerning citrus investigations, but there are always new questions coming up, as there are in relation to any other crop.

The CHAIRMAN. Take that clause that I have just read, "To investigate the diseases affecting citrus fruits, pineapples, and truck crops grown during the winter in the Southern States." Just take that up and tell us about it and why some of the money that has been used for that investigation can not be used for some other work now.

Mr. GALLOWAY. I think the best way to take up and answer that question would be to take up our latest work, as we have it in our line of projects. Our work through the country consists of a group of problems and we divide them up into several projects, so that we know just what we are spending every dollar for. Mr. Woods is here. He is in direct charge of that work, and the reason that I brought him along with me was, first, because he is assistant chief of the bureau and is as familiar with the details as I am, and I am going to ask him to answer that question.

The CHAIRMAN. Will you tell us just how much money was allotted to that work under the bureau that you are operating under now?

Mr. Woods. The total appropriation was \$180,639.

Mr. Bowie. That is within the whole office?

Mr. Woods. Yes, sir.

The CHAIRMAN. In the allotment of your money, how much did you allot to this object, "To investigate the diseases affecting citrus fruits, pineapples, and truck crops grown during the winter in the Southern States?"

Mr. Woods. The difficulty in my answering that question is that the wording of this bill has been accretionary; it has been added to from time to time, and our work is not divided in accordance with the way the paragraphs are put in the bill.

The CHAIRMAN. You have not your items arranged in this order?

Mr. Woods. No, sir. But under citrus fruits, or any investigation, we can tell you how much we are spending. The citrus work comes partly under three laboratories. One is the Pacific coast laboratory, under Newton B. Pierce, and at his laboratory there is practically nothing being spent the present year on citrus-fruit diseases. Then there is the tropical laboratory and gardens, at Miami, Fla., with an allotment of \$7,963 for all the work of the laboratory, and of this amount about a thousand dollars has been allotted to citrus-fruit diseases this year. We simply have authority in this item to investigate any citrus disease that comes up.

The CHAIRMAN. That is the intention of Congress.

Mr. Woods. During the past year we have worked especially upon a disease that attacks the tips of the citrus trees and causes a killing back, similar to the pear and apple blight, and also produces a rot of the fruit in the orchard, in transit, and in storage, altogether causing the destruction of a great deal of citrus fruit.

Mr. Rolfs, who is in charge of this laboratory, has been working on this disease for several years, and last year made quite an extended treatment of orchards with Bordeaux mixture and demonstrated that this disease could be almost completely prevented.

The CHAIRMAN. Bordeaux mixture seems to be the cure for almost all diseases. It is like some of the patent medicines, which cure everything, is it not? What does it consist of?

Mr. Woods. It contains copper, which is the most destructive metal to fungi that we know of. Almost all the contagious diseases of plants are caused by bacteria or fungi, to which copper is very destructive, and that is the reason that it is used with such success. Here in the pathological laboratory in Washington we have spent a couple of hundred dollars on the examination of diseased citrus material sent to us by correspondents. This estimate of expenditure is based on the time it takes the assistants in the laboratory to make these examinations. We have been carrying on this investigation of citrus-fruit diseases for several years, and have reported on most of the important diseases, with the exception of citrus blight. We know how to cure the blight now, but we do not know the cause of it. We have been spending very little money on the investigation of citrus diseases for the past two or three years.

The CHAIRMAN. You spent a good deal of money on that at one time?

Mr. Woods. Yes, sir; our work at the subtropical laboratory at one time was almost all on citrus diseases, but now it is on truck crops in the South. At the California laboratory the work is almost entirely on vine diseases and diseases of the English walnut.

The CHAIRMAN. Now, take up this next clause, "To investigate canaigre and other tannin-bearing plants."

Mr. Bowie. What is that?

Mr. Woods. Canaigre is one of the docks. The root contains a high percentage of tannin. It was thought at one time that it would be very valuable for the tannin, and some people in certain places in the West where it was thought that this plant would do well asked that this item be put in here, and that we look into the subject.

The result was that two years ago we made a thorough investigation of everything that had been done, commercially, with this crop. We examined the nature of the tannin and found that it was valuable only for a small class of leathers, and that the plant could not be grown commercially on account of the large amount of labor required and from the fact that it was limited almost entirely to Arizona and the Southwest, where labor is very scarce. We have therefore done nothing further on the investigation of canaigre for two years at least, except to record such information as comes to us.

The CHAIRMAN. Is there any necessity for keeping that in the bill, then?

Mr. Woods. No, sir; there is no further necessity for that item.

The CHAIRMAN. That is closed, then.

Mr. GALLOWAY. May I make a suggestion here in reference to this whole matter of the provision for the Bureau of Plant Industry. It is a sort of a crazy-quilt affair which has developed from year to year, and has come down from the old organization when we had separate divisions. There are ten times more paragraphs in there than are necessary or essential for the work, and the whole thing of the handling of many studies can be greatly simplified if the entire Plant Industry Bureau item were recast, like the Weather Bureau or the Bureau of Animal Industry. As it is, we must keep all these distinct items here. You add a paragraph for grain growing, and we have to keep a separate paragraph for that particular item, and it means more bookkeeping and more work, and I do not think it means any more in an intelligent way to the committee.

One other suggestion, and that is that we have the entire work of the Bureau divided into problems and projects.

The CHAIRMAN. But your division does not correspond with this list as it is in the bill?

Mr. GALLOWAY. It does not correspond with that in the bill; but it corresponds to the logical system of handling the work.

The CHAIRMAN. The next clause is, "To investigate and report upon the diseases affecting plants on the Pacific coast." That would come under the work of the first paragraph, would it not, "To investigate the diseases affecting citrus fruits, pineapples, and truck crops grown during the winter in the Southern States? Or does it affect a different class of fruits?

Mr. WOODS. A different class of fruits. The work that has been done under that item has been on vine disease and diseases of the English walnut, and pear blight, and other diseases that we are called upon to give advice about out there.

The CHAIRMAN. The next is, "To originate or introduce improved varieties of fruits and vegetables in cooperation with the section of seed and plant introduction." What are you doing along that line?

Mr. WOODS. That is Doctor Webber's laboratory of plant breeding. He is working on cotton and corn and fruits, the hardy oranges and pineapples, and crops resistant to alkali, improved oats and potato breeding. Tobacco breeding in Connecticut and Florida also comes under this item. These are the main projects in the plant-breeding laboratory. The cotton-breeding work has not cost very much. Only about \$4,000 has been given to that this year, because a large portion of it has been done in connection with the boll-weevil work. On the production of improved hardy oranges \$2,000 has been spent.

Mr. LEVER. Have you not been very successful in the cotton-breeding business?

Mr. WOODS. The work has been very successful, especially in the improvement of upland cotton, in the matter of staple and yield, by straight selection, and by hybridization. The last time we were here we discussed to some extent the improvement of the upland cottons by the production of hybrids by crossing with the sea-island cotton, and these hybrids have been under test now for nearly four years. Some of them are proving practically fixed and very valuable. But the greatest and most important advance has been in the selection of certain types of upland cotton, where the lint has been increased in length a quarter of an inch and the plants yield true to seed.

Mr. LEVER. How will the price of that cotton compare with the ordinary short-staple cotton?

Mr. WOODS. I do not know, but I know that it brings a higher price.

Mr. LEVER. A gentleman not long ago came to me with some cotton in his pocket which he showed me, and he said that he got for that cotton 13½ cents, while the market called for 11 cents. I have been over the farm down there where that was produced.

Mr. WOODS. The yield per plant has been very greatly increased, and the uniformity of the fiber has been increased, as well as the length of the staple, and the increase of a quarter of an inch which yields true to seed is considered by the cotton men as a tremendous advance.

Mr. LEVER. Your difficulty there has been to get a fixed type, is that it?

Mr. WOODS. Yes, sir; but the difficulty has been to breed out that tendency to vary in the hybrids. Two years ago you questioned me pretty closely on why we did not finish the work on these hybrids. We have found by these straight selections, of such types as the "Russell," and the "Jones Improved," which are two good types of upland cotton, that we can improve those types by straight selection, and that those do not vary and go back, as the hybrids are likely to do.

Mr. GALLOWAY. In regard to the improvement of cotton, the work there has been done with a view of finding types that will be early, and will be earlier than the various types we have been able to find in other sections, and with reference to the selections we have been able to secure, there are heavy yielders which are also fully as early as the earliest cotton that we have found.

Mr. LEVER. Now, go to the upland long staple—the hybrids. The complaint down home is that the yield per acre of that cotton is not as great as of the ordinary short staple. Are you doing anything to increase the yield per acre?

Mr. GALLOWAY. Yes, sir; our work is in two directions; to increase the staple, but also to increase the yield per acre. If this experiment could be carried out logically we could grow pretty nearly double the quantity of cotton now produced on the same ground. The inherent possibilities are all there, and from the fact that cotton varies so exceedingly, and especially these long-staple types, we find one that is yielding very heavily, and another that is yielding in a very shy way, which gives us the possibility of making those selections.

Mr. WOODS. Our yields of the long staple have been equal to any of the yields of short-staple upland cotton. So that if we can get them fixed, and there is every indication that they are becoming fixed, those types should be wonderfully superior.

The CHAIRMAN. If you do not get an increased yield, you are getting an increased price, anyway?

Mr. WOODS. Yes, sir; an increased price, anyway; and the indications are that we will get as good a yield as any of the upland cottons give.

The CHAIRMAN. So that it will be of material benefit to the cotton grower, you think?

Mr. WOODS. Undoubtedly.

The CHAIRMAN. The next clause reads "To study the relation of soil and climatic conditions to diseases of plants, particularly with reference to the California vine diseases and diseases of the sugar beet."

Mr. WOODS. That work comes under two allotments, one for the Pacific coast laboratory, where Mr. Pierce has been working particularly on the California vine disease. Very little has been expended on this disease during the last ten years. We have, however, finally determined that we have a resistant stock, the "Lenoir," which we have had eight years, under observation. This root seems perfectly resistant to the vine disease, and we can now grow the fine raisin grapes grafted on "Lenoir" roots in a section which has had its industry destroyed by the California vine disease.

In the sugar beet work Doctor Townsend has been studying especially the relation of climate, soil, and fertilizers to the production of curly-top, which is a disease which we have not yet found out the cause of. We can not find any parasite connected with it, and it seems to be due to some condition of the soil and climate; that is, some relation of climatic conditions and soil conditions to the growth of the beet.

Mr. BROOKS. Where does that manifest itself most?

Mr. WOODS. In Colorado and west to the California region. It is worse in California.

Mr. BROOKS. That is what they call the blight?

Mr. WOODS. No, sir; the blight is due to a fungus, causing a spotted leaf.

The CHAIRMAN. We have that in our country.

Mr. WOODS. Yes, sir. We have stopped work on that, because we have shown that it can be entirely prevented by the Bordeaux mixture, with proper spraying. The only difficulty now is in getting a spraying apparatus that will economically spray the beets, and Doctor Townsend has invented an apparatus which works very much like the potato sprayers and which can be manufactured for \$50 or \$60, and gives excellent results. Now, the problem that remains is to get the farmers to spray their beets, and we have found that it is not sufficient to merely send them a bulletin and tell them that to spray the beets is a good thing. It is necessary to go out and show the farmers how to set up the apparatus and how to make the spray and how to apply it, and if they see at the end of the season they get good results from it, then they will use it themselves after that.

The CHAIRMAN. Does the Bordeaux mixture kill mustard? We use the copper sulphate, and that kills the mustard and does not hurt the crop. Would that do equally well for the beets?

Mr. WOODS. It is copper sulphate, also used as the basis of Bordeaux mixture, that kills mustard.

The CHAIRMAN. Could you not use the ordinary sprinkler that we use in the mustard work and do as well with the Bordeaux mixture?

Mr. WOODS. I do not think it would throw a spray. You see, the Bordeaux mixture contains considerable lime, and it requires a nozzle that allows it to come out in a misty form.

The CHAIRMAN. I do not think that in the ordinary sprinkler it comes out in a misty form, but it comes out in little streams like the water from a sprinkling cart. It kills all the mustard and does not hurt the pea vines.

Mr. GALLOWAY. The sprinkle will kill the mustard, but this sprayer makes a mistlike spray that will settle all over the leaves of the beets, not only on top of them, but underneath also.

The CHAIRMAN. I have seen potatoes covered underneath and all over the whole plant.

Mr. WOODS. It is the same method of spraying which is used for potatoes, except for the difference in the culture of the beets. You have to be able to move the nozzle around in a convenient way.

The CHAIRMAN. Is this curly-top a serious trouble with beets?

Mr. WOODS. Yes, sir; it is in certain places; in Colorado and in California.

Mr. GALLOWAY. It is worst in Colorado and California.

The CHAIRMAN. The next is: "To continue the work of originating, by breeding and selection, in cooperation with the other divisions of the Department and the experiment stations, new varieties of oranges, lemons, and other tropical and subtropical fruits more resistant to cold and disease and of better quality."

What have you done along those lines?

Mr. WOODS. We have secured a large number of hybrids, which we are testing. During the last year we have distributed two of the hardy oranges, which we have named citranges, owing to the fact that they are quite sour, nearly seedless, and they are very valuable for such use as you make of the lemon and the lime, and they will grow very much farther north. They have been tested away up in the Carolinas and found to live all right. They will be a very valuable fruit.

We have secured seedlings of this second generation. We do not expect, from the first generation, to secure a hardy orange, but we have secured one orange which is practically of the same size and shape and juiciness of the sweet orange, and what we have now to do is to breed the acid out of it. That is comparatively simple. Fortunately this orange has produced one or two seeds, and we expect that from this generation we will get every variation between our sour and sweet oranges. And it will also be an orange which, on account of its hardness, will grow possibly up as far as the Carolinas. They are deciduous and behave very much like the apple.

Mr. SCOTT. Do those citranges substitute for limes, or oranges?

Mr. WOODS. They have a distinct use of their own. They are used for marmalades and lemonades and citrangeades.

Mr. HENRY. They make very palatable lemonade; I have tried them.

Mr. SCOTT. What I wanted to know particularly was whether they seemed especially to resemble the lemon or the orange?

Mr. WOODS. They really do not look very much like either one. They look more like a yellow lime than like a lemon or an orange. They are considerably larger than a lemon. They are as large as the Porto Rican orange. We have one of them that is as large as a navel orange.

We have also a new tangerine. The trouble with the ordinary tangerines is that they lack juiciness. These which we have are a cross between the tangerine and the sweet orange, and they are very juicy, and their other qualities are also considered by the experts to be very valuable.

Mr. SCOTT. Will this tangerine propagate by the seed?

Mr. Woods. No, sir; it is propagated by grafting, and from the bud.

Mr. Scott. You always get what you are going after?

Mr. Woods. Yes, sir; from the bud we do. We can not get it from the seed.

Then we have the tangelo, which is a table fruit, superior to the pomelo.

The CHAIRMAN. Is it a fixed type?

Mr. Woods. Yes, sir; all those fruits are fixed. As long as you propagate them from buds you get the same thing every time.

The CHAIRMAN. Where does the grape fruit come in?

Mr. Woods. That is a pomelo; practically the same.

The CHAIRMAN. What is the difference between the acid of the lemon and the acid of the grape fruit?

Mr. Woods. Chemically there is no difference, but it is combined in the grape fruit with a bitter part which gives it a different flavor. In the lemon it is combined with an essential oil which gives it the peculiar lemon flavor.

The CHAIRMAN. It is only a few years since grape fruit has become common in the markets. Has the Department had anything to do with the culture of the grape fruit, or in the changing of the conditions? Is that a commercial proposition?

Mr. Woods. Yes, sir; the grape fruit culture is a good commercial proposition and the Department has helped to develop it. There has been a difficulty in marketing the grape fruits which needs investigation.

The CHAIRMAN. That is a question of transportation?

Mr. Woods. Yes, sir; and that will be discussed under pomology.

Mr. Brooks. Two years ago someone from the Bureau gave quite an interesting description of some experiments on increasing the range of the growth of grape fruit, and I think you said you had gotten it so that it matured in the latitude of Florida.

Mr. Woods. That was the hardy orange. The grape fruit is so tender that its range can not be much extended. We might increase its range to northern Florida, but not any farther than that.

Mr. Scott. Where is most of the grape fruit grown that supplies the markets?

Mr. Woods. In California and Florida.

Mr. Galloway. The finest grape fruit is grown in Florida and in certain sections of California.

The CHAIRMAN. That grown in California is not as good?

Mr. Galloway. No, sir. It is thick skinned. The grape fruit has proved very profitable. It has paid as high as \$25 a tree, and many of the groves there are planted on soil where the rocks must be blasted before you can get in your tree. It takes a stick of dynamite for each tree.

The CHAIRMAN. Here they sell for \$6 a box, 60 of them in a box. That is ten cents, the wholesale price. There must be profit in that.

Mr. Galloway. Yes, sir. I was in Florida two years ago, and a gentleman took me to his place, and we were going along and there was a great explosion. I asked what that was. I thought that it was a stone quarry, or something of that sort, but he said "No, we are preparing some ground for grape fruit." They take the surface pine trees off, and they blast in and make a place for the grape fruit trees. It is a very loose limestone rock, and they plant the velvet bean

in there, and it makes pretty good soil. They showed me places where the soil was very good indeed.

Mr. HENRY. In what place was that?

Mr. GALLOWAY. Miami.

Mr. HENRY. I saw a grove near Palatka which was growing finely.

Mr. GALLOWAY. We have now several varieties introduced from other countries. We had one introduced from Siam, given to us by one of the notables there. We had one tree, and when the fruit ripened we sent it to their minister here, and he said it was considered the most worthless that they had in Siam.

The CHAIRMAN. The next clause reads: "Varieties of wheat and other cereals more resistant to rust and smut and better suited to the various sections of this country."

Mr. Woods. A part of the money devoted to cereal investigations goes to this particular work. We have been working especially and studying on the question of the way certain smuts get into the wheat. There are certain varieties of loose smut that are exceedingly difficult to prevent, and no treatment which has been proposed has been found successful.

The ordinary wheat and oat smut can be easily controlled, but this particular one we find enters the flower while the wheat grain is forming, and the smut fungus is in the forming kernels; so that no treatment which only touches the outside of the kernel will affect it. We have simply discovered that this is the fact. Now, the question is to determine whether there is any difference between those defective kernels and the healthy kernels, and if so whether they can be separated by any process. We have an indication that the affected kernels are more easily killed by hot weather than the sound kernels, and it may be that we can, by raising the temperature to a certain point, be able to destroy the diseased kernels.

We have another line of attack opening up which will perhaps be more successful, not only in the control of this disease but in improving the general quality of wheat and other grains. This lies in establishing seed-breeding plats. Have the farmer grow his seed wheat in a separate plat, where he can afford to go in and pull up all his smutted stalks, and that will accomplish just what we have been able to do with the tobacco growers—to select their plants, so as to attain to a very much higher quality than is possible now with promiscuous seeds, including seeds of all sorts of producing ability.

The next clause relates to rust, and we have done very little on rust.

The CHAIRMAN. That work is in progress?

Mr. Woods. Yes, sir. We have done very little on rust the past season. In fact, for the past four or five years we have done very little on it, but we have now a new line of attack which makes it worth while to take up the matter again. We have shown by our tests of Macaroni or Durum wheat, that we have a wheat which is almost entirely rust resistant. It is a definite character, because it is transmitted to crosses. We have hopes of improving the rust-resisting characteristics of the spring and winter wheats.

The CHAIRMAN. By crossing it?

Mr. Woods. Yes, sir; with the Durum.

Mr. Cocks. Has that been tried on the low-lying coasts in places like New Jersey and New York?

Mr. Woods. No, sir; only in the Mississippi Valley.

Mr. COCKS. Have you tried it in the wet parts of the Mississippi Valley?

Mr. WOODS. No, sir.

Mr. COCKS. This is not the section under which you discuss arid grains and Durum wheat as such?

Mr. WOODS. No, sir.

The CHAIRMAN. The next is: "Varieties of rice more resistant to 'rice blight,' and for experiments for the substitution of other products on rice lands."

Mr. WOODS. Owing to the fact that the rice industry of South Carolina was threatened by rice blight, you gave us \$10,000 for making this investigation. That was divided into three lines of work—the pathological work, the truck crops, and, third, the general crops. The pathological work was under my direction, and we arranged for cooperation with the South Carolina experiment station and put a man in the field, who studied the diseased plants in the field and tried a lot of experiments in controlling it. We found a fungus associated with the disease. We were never able, however, to take rice that was growing in a healthy manner and make this fungus cause the disease upon it. We determined that the fungus could attack the plant only under peculiar conditions, brought about by soil conditions, which made the plant more susceptible to the fungus. We discovered that that was due, probably, to some sort of excessive acidity in the already acid soil—that is, to a greater acidity than already existed—and we thought that might be controlled by liming the soil. We tried very heavy liming, and we found that by that process we could modify that soil sufficiently so that the plant could resist that fungus; and we think that liming will practically control this disease.

The CHAIRMAN. So that from a commercial point of view it is practicable?

Mr. WOODS. Treating by this liming process is entirely practicable.

The CHAIRMAN. Do you not think many of these diseases are brought about by soil conditions?

Mr. WOODS. The susceptibility of a plant is often due to some climatic or soil condition. We can get around that by adapting the plant to the conditions, and when we do that we prevent the disease. However, we have diseases that are so wide in their ability to attack a plant that we have to use a fungicide on the surface of the plant.

Mr. LEVER. You estimate to continue this work.

Mr. WOODS. What we propose to do is to drop the pathological investigation in the field. We will continue work in the laboratory until we determine where that fungus came from.

Mr. SCOTT. Is rice grown under water?

Mr. WOODS. Yes, sir; the ordinary rice is. Of course we have some upland rice that does not grow under water. But this disease does not occur in upland rice except where there is a very acid soil. Next season this money that we have been expending for pathological work on rice we shall devote to making large practical field tests with lime. We must show that it will pay the farmers to apply the lime, and we feel sure that it will.

The CHAIRMAN. The next clause reads: "Varieties of cotton more resistant to disease and of longer and better staple." You touch on that?

Mr. Woods. Yes, sir; on the long staple. We worked on the control of the wilt in the sea island cotton, and our work on that for the last few years has been to hold to the types that we have produced. We have been expending very little on that phase of the work, but we have found that the wilt in upland cotton is rather more difficult to control.

While we have resistant varieties, they have not proved to be as perfectly resistant as the sea island types, and we have been continually selecting to see if we could not raise the resistance of these upland types. We have cotton now that will produce a very good crop in upland soils, but there will be from 5 to 10 per cent of wilt in it.

The cost of that work has not been very great; I think not to exceed a thousand dollars on this wilt-resistant work.

The CHAIRMAN. That was for the reason that you could not expend any more advantageously, and you had to feel your way along?

Mr. Woods. Yes, sir. These selections have to be handled by experts, and we have only one man who is able to do that work, and the work is limited by what he can properly oversee in the field.

Mr. SCOTT. To what extent has your work gone?

Mr. Woods. Among the sea-island cotton planters in South Carolina it has been taken advantage of by practically everyone growing cotton on wilt infected land, and large areas of this land that were, before they became infected, raising immense quantities of cotton, but on account of this disease were not producing cotton at all when we began our investigation, are now back in cotton again.

Mr. SCOTT. That is a liming proposition?

Mr. Woods. No, sir; wilt resistance.

Mr. SCOTT. Where do they get that seed?

Mr. Woods. From us, a lot of it, first; and we have shown them how to select. The sea-island cotton growers are very skillful breeders. You show them how to select, and they can do it. In connection with that, we have developed a resistant cowpea, the "Iron," which we called attention to two years ago, and on which we have continued selecting, although it has cost us very little. This cowpea has proved perfectly resistant, wherever it has been tried.

Mr. GALLOWAY. The cowpea is a necessary adjunct to this cotton growing, as it is used in rotation, but it became affected also with this disease so that it was necessary to produce also a resistant cowpea.

Mr. SCOTT. Have you found that in fields where your wilt-resisting seed has been used, the diseased condition gradually became eliminated?

Mr. Woods. Yes, sir; after a few years you can plant a crop of ordinary cotton there. It has been done. It suffers very much less, although we found that this fungus lives in the soil for at least seven years, and we do not know how much longer.

In this connection we find that the "Iron" cowpea is resistant to root knot or nematodes, which is also a very bad disease, and that makes this variety of cowpea very valuable for a soil improver; in peach orchards where the nematode gets in it ruins the orchard. We have crossed this cowpea with the "Wonderful," which is a very heavy yielder but is not resistant to nematodes or wilt, and we have produced a hybrid that is apparently perfectly resistant to both.

The CHAIRMAN. The next item is "Varieties of pears and apples more resistant to blight and better adapted to export."

Mr. Woods. That is a work going on in connection with our other work on apples and pears. There has been no expenditure, except in time, and I do not think it has cost us a hundred dollars worth of time. We have secured a large number of hybrids which show evidences of being resistant to these diseases. We have several hundred of them growing on the Arlington farm, and when they grow large enough to secure a sufficient number of buds, we will test them. It is very slow work, and we will not spend any money on that work until we see that we have secured something valuable.

The CHAIRMAN. The next is "Varieties of tobacco of uniform type and of better quality."

Mr. Woods. That work we undertook three years ago in order to help out the situation in Connecticut. You remember the Department of Agriculture started some work on tent-grown tobacco, but owing to the great variation in type of the tobacco produced under those tents, a market could not be found for the product.

It occurred to us that the difficulty was due to variations in the plant that could be bred out, and the matter was discussed before the committee, and you decided that it would be worth trying and gave us \$10,000 for that work. We put two of our best men on that proposition, men who had been trained on corn breeding out in Illinois, but never had worked on tobacco; but Mr. Shamel was thoroughly conversant with the matters of plant breeding and he lived up there with the growers one season, and with the aid of expert growers selected the different types of tobacco that could be distinguished in their fields. He found 16 or 17 distinct types of tobacco in those fields which had been supposed to be all of the same type. We saved the seeds from those types and proved to the growers that those types grew true to seed. Mr. Shamel also showed that by bagging the seed before the flower was open he could secure uniformity in type of plant and so secure a plant that exactly meets the requirements as to shape and size and thickness of leaf. We planted those seeds next year and found that they produced almost absolutely true to type. If you plant 500 seeds you get 500 plants so nearly alike that you could not tell them apart.

Mr. GALLOWAY. It is a simple matter; but for years we have been introducing and disseminating tobacco seeds from Sumatra and so forth, and when that seed was planted in this country we would have various types. But from this simple discovery that the pollen from different plants, if allowed to fertilize other plants, would produce a mixed progeny. That is a discovery of Mr. Shamel. One tobacco plant will yield almost enough seed for 30 acres of land, so that it is not uncommon to see the fields now dotted with these plants.

We started out last year to select the tobacco seed for the different sections of the country, and we have work inaugurated in Connecticut, Florida, Kentucky, and Ohio, the idea being to abandon the old method of miscellaneous Congressional distribution of tobacco seed purchased in the open market, and in lieu of that to send out these new selected types of tobacco seed. We are this year sending out such seeds to persons desiring to test them, and we will send into the different districts the proper types selected in this way. We do not propose to send out any special number to any

particular district; but if a Member has a constituent in Kentucky, we will send one package of seeds to that man in order to start him going in this type.

Mr. HENRY. Let me say to the chairman, who is apt to allude facetiously to the shade growing of tobacco in Connecticut, that the failure of the experiment of growing tobacco under shade in Connecticut was owing to the selection of bad types; but this last year there have been 280 acres, altogether, of tobacco grown there, and one man writes me that he has grown 21 acres this year, and he has already sold his crop for \$1,100 an acre and got his money—\$1,100 an acre. Other men also write me that they have grown tobacco this year at a profit exceeding \$500 an acre. So that the problem is being worked out through the efforts of Mr. Shamel and others.

The CHAIRMAN. My point was that I thought that the Department advised people to invest their money in this thing before they were prepared to properly advise them, and that they ought not to have done that. There was a great deal of money sunk there, and I think they did that somewhat on the recommendation of the Department, and the results proved that the Department had not been sure enough to make those recommendations; in other words, that they had not gone far enough in their demonstrations before making the recommendations they did.

Mr. HENRY. Mr. Floyd told me the other day that he had marketed his crop at \$500 an acre. He has left the Department. He was not at fault, and the Department was not at fault, because promoters rushed in there.

The CHAIRMAN. I think the Department was a little too enthusiastic.

Mr. HENRY. I think the Connecticut farmer was enthusiastic, rather than the Department.

Mr. WOODS. It might be said of the Department's recommendations, and, in general, of this, that there was no one at that time who knew to what extent this tobacco would vary, and while we thought that the tobacco would vary, we did not know that there was going to be any such extent of variation as there has been.

The CHAIRMAN. That is what I say. I do not think that the Department had reached the point where they should have recommended the investment of capital in it. I think the Department was a little too enthusiastic in recommending these people to invest their money. It was done upon the recommendation of the Department.

Mr. WOODS. I think the Department was very careful not to recommend anybody to invest in this. But these men may have invested their money, misinterpreting the Department. I would like to add there that while we have practically eliminated this variation in the shape and size and number of leaves, there are still questions which have to be worked out in connection with the quality, and aroma, and burn of the tobacco, and those are questions we are now working on in Connecticut, as well as other places. The ordinary tobacco produces lots of suckers, and we have produced tobacco which will produce suckers only an inch or so long and then they stop growing and do not sap the strength of the plant. We have produced tobaccos that produce, instead of ten leaves, more than twenty leaves, and we have bred the leaf so that it produces a rounder leaf.

The CHAIRMAN. Have you fixed those types?

Mr. WOODS. Those types are fixed, and we have a lot of hybrids now which are proving very valuable. For instance, one, the "Uncle Sam Sumatra," a type of Sumatra for tent growing which is pronounced by experts to be equal to anything produced in Sumatra or anywhere else. We have another, the "Hazelwood Cuban," which is pronounced by the tent growers to be practically ideal. Then we have the "Cooley" hybrid, that produces true to seed and produces a very fine quality of outdoor leaf.

Mr. GALLOWAY. That is a cross between the Habana and the Sumatra, and it is selling at 30 cents a pound this year.

Mr. SCOTT. How about the Texas experiment for producing tobacco?

Mr. WOODS. That is Mr. Whitney's work. Our work has been confined to Florida and Connecticut.

Mr. HENRY. Are you hopeful of finding a variety of Sumatra that will be a success?

Mr. WOODS. This hybrid, "Uncle Sam Sumatra," is pronounced to be a success.

Mr. HENRY. Yes; I have seen that, and I know that it is said to be a success.

Mr. WOODS. They have decided to put it out under the name of "Uncle Sam Sumatra," to show that it is an American Sumatra.

Mr. SCOTT. You have said that this experimentation was Mr. Whitney's work. It strikes me as a little curious that work along similar lines should be under separate bureaus.

Mr. WOODS. He is not working on the improvement of tobaccos. He is simply testing the ordinary growth of tobacco down there, using such seed as he can get hold of. He is, however, also using our seeds.

Mr. SCOTT. Of course, he is at the head of the Bureau of Soils?

Mr. WOODS. Yes, sir.

Mr. SCOTT. And he does his work to ascertain what soils are suitable to certain plants?

Mr. WOODS. Yes, sir.

Mr. SCOTT. But when he has made these investigations, and made a recommendation, it rather seems to me that the work of practical experimentation with the results in regard to plants would fall to you.

Mr. WOOD. It does, practically, and we try to draw that line. That is why we got into this. Mr. Whitney is doing his cultural work in Connecticut.

Mr. SCOTT. Is he there now?

Mr. WOODS. He had one tent last year.

Mr. SCOTT. Does his work duplicate yours?

Mr. WOODS. No, sir. We are on the question of improvement and he is on the general culture, the soil conditions, and so forth.

Mr. GALLOWAY. Mr. Woods omitted one little item in reference to the work we did up there in connection with the variation of the plants in connection with the large and small seed. Mr. Shamel made a suggestion in regard to that when he first started work there, and found that plants from seed as ordinarily handled would grow of different sizes and reach maturity at different times in the field, and

that suggested the advisability of the separation of the seeds, whereby the larger seeds only would be planted. The seed was subjected to a blast of air, whereby all the light seed was blown out and the heavier seed remained. There is a great difference to be observed when those seeds are planted and the plants grow up. Those from a large seed will be that high [indicating], while those from the small seed will be only that high [indicating]. Since this was begun there have been a number of patented devices put on the market for separating the seed, but the thing is so simple that any farmer can make his own.

The CHAIRMAN. We do the same thing in regard to our wheat seed.

Mr. GALLOWAY. We use simply a blast tube, with a foot bellows. The light seed will blow out and fall over the edge and the heavy seed will fall back.

Mr. HENRY. You take a handful of the seed that has been through the blast and you can see the difference at once.

Mr. GALLOWAY. Yes. That is an experiment that our tobacco growers catch on to.

The CHAIRMAN. It is the same way with wheat and oats and barley and all that sort of thing.

Mr. GALLOWAY. We have now, from the Connecticut Valley alone 226 applications for the seed of these hybrids.

The CHAIRMAN. How much seed can you give out?

Mr. GALLOWAY. Just enough to give a man a start.

Mr. TRIMBLE. I wanted to ask the Doctor if he used this method for Kentucky.

Mr. GALLOWAY. We did some preliminary work in Kentucky last year, and we have asked for a small increase of \$8,160, to take up the work in Kentucky.

The CHAIRMAN. What work is that?

Mr. WOODS. Extending the tobacco work to Ohio, Indiana, and Kentucky, and the southern districts, exclusive of Florida, where we are already working.

Mr. GALLOWAY. Increasing the pathological investigation. We ask for \$8,160.

The CHAIRMAN. What have you done in the way of the beet seed, not to eliminate the sprouting, but to eliminate the heads?

Mr. WOODS. That work has been going on for a couple of years. When we started in we found one seed in 2,000 that had a single germ in the general run. We now have plants that produce uniformly about 25 to 27 per cent of single-germ seeds, so that we have the plant running in that direction.

The CHAIRMAN. One of the greatest expenses in raising beets for beet sugar is that you have to thin out the crop by hand.

Mr. BROOKS. Has that got to the stage yet where you dare say anything about it?

Mr. WOODS. We do not say much about it; but when we have made the progress I have stated, from one seed in 2,000 up to 27 per cent, we certainly can say that there is a decided tendency to produce what we are after. And we have tested the sugar-producing power of the beets from this seed, and it is fully up to the standard.

Mr. BROOKS. How many seeds do you select to give your 27 per cent? How large an experiment is that—a large or a small experiment?

Mr. WOODS. That is field work.

Mr. BROOKS. Where do you carry that on?

Mr. WOODS. In Colorado, to a large extent.

Mr. BROOKS. That is a good place to carry it on?

Mr. WOODS. One of the best. We have a little of this work in Utah.

Mr. BROOKS. Is it in Washington State at all?

Mr. GALLOWAY. No, sir. The work we do there is in connection with breeding sugar into the beets, and we have beets there that are running as high as 24 per cent sugar. This has not been in the line of producing single-germ seed, but increasing tonnage by the increase of fertilization and increasing the sugar content by the mother beet.

Mr. WOODS. We aim to get a beet which will give us about 90 or 95 per cent of single-germ seed, and then it is entirely practicable to separate out the heavy seed——

Mr. GALLOWAY. So that we will get the highest sugar content?

Mr. WOODS. But there has been no decrease in the sugar content in these beets produced from the single-germ seed.

Mr. COCKS. I raise sugar beets to feed to my cows. I understand what you mean, but I do not understand what you mean by the "tops."

Mr. WOODS. The beet seed forms the second year. You have to save the beets, and the second year they produce a great mass on top, and each one of those little bunches composing the seed mass is a little ball which contains from three to five seeds.

Mr. BROOKS. Germs?

Mr. WOODS. Germs; yes. They are really seeds. If you plant one of those balls, nearly all of those germs or seeds will grow. Then a man has to go out in the field and get down on his knees and break off all but one of them, and in that process he has to be very careful or he will injure the one that is left; and, unless he is very careful, some fungus will get into the plant and injure the beet. The labor is so great that it raises the cost of growing beets very materially indeed. With this single seed you can put the seed in an ordinary planter and plant it as you would corn or anything else.

Mr. COCKS. Is it possible that we could do anything of that sort with the ordinary beet? I never heard of anything of that kind. We use the sugar beet for planting, to feed to stock. I am not speaking about raising beets for seed, but I understand that this same thing applies to the ordinary beet that you raise for stock.

Mr. WOODS. Yes, sir.

Mr. COCKS. Those beets grow just the same?

Mr. WOODS. Yes, sir.

Mr. GALLOWAY. Do you thin your beets?

Mr. COCKS. Yes, sir; we thin them.

Mr. WOODS. It is just the same way with all beets.

Mr. COCKS. That would be true of corn or anything else you planted as thick as beets are planted?

Mr. WOODS. You can not help but plant four or five of these germs, because they are in a cluster, and you can not get them apart.

Mr. COCKS. Oh, that is what you meant.

Mr. WOODS. You can not break those clusters apart, you know.

Mr. COCKS. They come up like individual plants, then, and you have to thin them out?

Mr. WOODS. Yes; but in the case of the sugar beets you have to thin them out pretty early, or the shape of the beet will be spoiled.

Mr. BROOKS. This is not the place in the bill where the appropriation for that is carried?

Mr. WOODS. Yes, sir.

Mr. BROOKS. Just one question on this. This appropriation involves the continuance of that beet-sugar work, does it not?

Mr. WOODS. Yes, sir.

The CHAIRMAN. The next clause reads: "To investigate the causes of decay in forest timber and timber used for construction purposes, and to devise means for preventing the decay of the same." Ought not that work to belong to the Bureau of Forestry?

Mr. WOODS. We conducted that work for a couple of years in connection with the Bureau of Forestry. But the decay end of it is pathological. That is the line we have been working on. As soon as we get results that can be applied on a large scale we turn them over to the Bureau of Forestry and they make use of them.

The CHAIRMAN. What progress have you made so far?

Mr. WOODS. In the first place, we have worked out the causes of 15 or 20 bad timber rots. We have determined the conditions that cause them, and how they get into the woods. For instance, in some of the big gum forests in the South we found that a large percentage of the logs were rotted by one of these fungi, and we have kept the rot out of those logs simply by painting the ends of the logs with creosote as they lay on the ground; and that little maneuver has saved those logs.

The CHAIRMAN. Is that a quick-working fungus?

Mr. WOODS. Yes, sir; very quick working. It starts at one end and goes right through to the other, and causes a complete rot.

The CHAIRMAN. That is what causes the quick rotting of timbers?

Mr. WOODS. Yes, sir. The quickness with which it rots depends upon whether the timber has a large amount of starch and sugar in the wood, and that depends largely on the season.

The CHAIRMAN. On whether it has the sap in it?

Mr. WOODS. Yes, sir. We have worked out the problem of "bluing" of white pine and bull pine and the ordinary pine timbers. You can hardly find any pine timber that has not some of these blue streaks in it. We found that this was due to a fungus that gets in after the lumber is sawed. That can be prevented from getting into the wood entirely by treating the lumber with corrosive sublimate, or any alkali.

The CHAIRMAN. Is it commercially possible?

Mr. WOODS. Yes, sir. As the lumber is sawed it passes through a large vat containing the proper solution. On the fence-post proposition, we found a very cheap method of impregnating fence posts with a preservative preparation. The old method was to put them in a cylinder, and put them under pressure, so that the creosote or other preservative would be forced into the wood. That was very expensive, costing 40 or 50 cents a post. We found that we could put the creosote into a big kettle and let the post stand in it, and bring the contents of the kettle to the boiling point and then let it cool, and as it cooled off still let the post stand in the solution, and it would completely impregnate that part of the post in the solution.

The CHAIRMAN. What about the life of the post?

Mr. WOODS. It would last twenty or twenty-five years.

The CHAIRMAN. How do you know?

Mr. WOODS. Because posts impregnated with creosote have been tested.

The CHAIRMAN. What timber did you use? Did you use hemlock or cottonwood?

Mr. WOODS. The cheapest, easiest thing that you can get.

Mr. BROOKS. Can you make a cottonwood post last twenty years?

Mr. WOODS. Yes, sir; at a cost of about 5 cents.

The CHAIRMAN. We used to boil our posts in pitch or coal tar.

Mr. WOODS. Yes, sir; and you took them right out.

The CHAIRMAN. Yes.

Mr. WOODS. We did, too, but the man that we had working with us went away one night and forgot to take the posts out, and that is the way we made this discovery, practically by accident.

The CHAIRMAN. What sort of a kettle would you have for that?

Mr. WOODS. A large tank made of boiler iron. If you wanted to treat a great number of posts you could build a wooden tank in which you could stand a great many posts in the solution after boiling them for a few hours. We had a big tank made of boiler iron, 6 or 8 feet across, in which we could set 50 or 100 posts. This tank was set on a piece of masonry work, with a grate underneath. The whole cost was about \$150.

The CHAIRMAN. You used that instead of a kettle?

Mr. WOODS. Yes, sir; and we had to pay \$6 or \$7 a day for the workmen to put it up.

The farmer could put up a plant that would do this work, I think, for not to exceed \$100. You could make a kettle that would boil 100 posts a day.

The CHAIRMAN. How long do you have to boil it after it reaches the boiling point?

Mr. GALLOWAY. About two or three hours. The common feed cooking device, that costs only \$40 or \$50, would do for this.

The CHAIRMAN. Do you put the whole post in the mixture?

Mr. WOODS. No, sir. It is supposed to be put in a solution 6 inches deeper than the post is going to be put in the ground.

The CHAIRMAN. About 4 feet long altogether.

Mr. WOODS. Yes, sir.

The CHAIRMAN. What do you calculate the cost of a post treated in that way to be?

Mr. WOODS. From 4 to 6 cents a post.

The CHAIRMAN. And how large a post can you impregnate by that process?

Mr. WOODS. We impregnate 6-inch posts and railroad ties in the same way. Some of the big telegraph companies, I believe, are adopting this method for their telegraph poles.

Mr. BOWIE. Are railroads adopting your system?

Mr. WOODS. Almost universally. Our system of impregnation and our improvements that we have worked out in the nature of the creosote to use are being almost universally adopted.

Mr. BOWIE. I talked to the Southern Railroad people recently, and they said that this thing is very valuable, but that the first cost is 50

great that it is pretty hard to get the management up to the point of going into it. What is the first cost?

Mr. Woods. You are speaking of the method of putting them in cylinders. Those cylinders cost about \$180,000 apiece for those big railroad plants.

Mr. Bowie. Then what does it cost to impregnate each tie? We will assume that a tie is worth 35 or 40 cents.

Mr. Woods. They figure about 60 cents.

The CHAIRMAN. That is oak, is it not?

Mr. Woods. Yes, sir.

Mr. Bowie. Sixty cents a tie?

Mr. Woods. Yes, sir; that is what they figure it at here.

Mr. Bowie. Down home it is not so high—at least, it was not.

Mr. Woods. Yes, not so high as here.

Mr. Bowie. Now, how much labor cost is there in those ties, not counting the cost of the plant, but the cost of the cutting and hauling to the place of application; how much is that per tie, do you know?

Mr. Woods. It has been figured out. I think it is about equal to the cost of the tie, but it increases the life of the tie, so far as rot is concerned, indefinitely.

Mr. Bowie. It would have to increase it more than the increased cost of the treatment, in order to make it pay.

Mr. Woods. It increases it very greatly. It more than quadruples the life of the tie. But it does not decrease the gradual destruction of the tie from the pounding it receives. After twenty years' use a tie will begin to crumble as the result of the pounding that it gets.

Mr. Henry. That is enough to make it pay?

Mr. Woods. Yes, sir; it pays.

Mr. Henry. It nearly doubles the cost of the tie?

Mr. Woods. Yes, sir; but it quadruples its life. Really the initial cost of putting in a plant would not be very much, compared with the great saving in the longer life of the treated ties.

The CHAIRMAN. I thought it was the pressure inside of the cylinder which impregnated the wood.

Mr. Woods. It is true that this pressure forces the creosote into the wood. Some of the railroads think that that is the only method of getting the preservative into the wood. But Doctor Van Schrenk thinks that they can do away with those tanks and use the new method. They could use large vats.

The CHAIRMAN. What are you doing under this prevention of timber decay?

Mr. Woods. We are taking up every timber disease that we can get hold of. We have practically completed this work in regard to the impregnation of woods.

The CHAIRMAN. It is up to the railroads to use it now?

Mr. Woods. Yes, sir; to anybody that wants to use it. We want to get this fence-post treatment tried by the farmers.

The CHAIRMAN. You know, I suppose, that the cement post is coming in, so that it is now only a question whether we could not afford to build cement posts?

Mr. Woods. That may be true; but out in the West, where they have a lot of cottonwood, you would find that by impregnating the cottonwood it makes a good post.

Mr. Cocks. That could be applied to the chestnut post, which is very fine to handle?

Mr. Woods. Yes, sir.

Mr. Cocks. And if you can make it last twenty years, that would be a very fine post.

The CHAIRMAN. It will make available a whole lot of cheap stuff that you have around on the farm?

Mr. Cocks. Yes.

The CHAIRMAN. I am paying to-day 24 cents a post for cedar posts from Canada. We do not get them any more in our country. If it was not for the wire, fencing would be a serious problem.

Mr. GALLOWAY. Fencing lumber is \$25 a thousand. Cypress is almost out of sight. It used to be \$18, and now it is \$27 or \$28.

The CHAIRMAN. The next clause is, "To investigate the practical application in agriculture of the fixation of atmospheric nitrogen by bacteria and other micro-organisms in soils and in the root tubercles of leguminous and other plants."

Mr. Woods. Of course we have discussed this question of nitrogen fixation before the committee in previous years. The question of the supply of nitrogen in soils is one of the very important questions in agriculture, because nitrogen is a very expensive product, and one which leaches out of soils quickly, and disappears as the result of cropping, and comes back very largely through the action of certain bacteria. One type of bacteria grows commonly in decaying grasses containing sugar. Having this supply of sugar these bacteria obtain nitrogen from the air and fix it in a form available to crops. Thus if you let a soil run to grass, and let the grass die down from year to year, as the leaves fall on it in the forest, year after year, this growth of bacteria will gradually increase the nitrogen in the forest soil.

There is another kind of bacteria that grow in connection with the leguminous crops—clover, peas, and beans. These crops have been used to improve soils and increase their crop-producing power for ages. This comes about through the fact that when these bacteria grow in the legume roots, that plant is enabled to get its nitrogen from the air, and instead of depleting the nitrogen in the soil, it fixes atmospheric nitrogen, and leaves it in the soil, where it is available for any crop that follows.

Mr. Cocks. How long will that remain in the soil? For instance, you plow under a crop of clover. Now, the nitrogen is soon depleted. Suppose another crop was put on; would that nitrogen be available two years after?

Mr. Woods. It might be available five years after, provided that the nitrogen did not leach away. That nitrogen combines with soda, potash, or lime, whichever happens to be in the soil.

Mr. GALLOWAY. It depends also on the following crops. Corn depletes nitrogen quite rapidly; but the evidence of the stations shows that the nitrogen from these leguminous plants remains six or seven years available.

Mr. Cocks. That is the most evasive and volatile element of plant food that is in the soil?

Mr. Woods. Yes, sir. The old idea was to take some inoculated soil and scatter it in the places where the clover did not grow and needed inoculation.

But the danger of this method is that we scatter so many root diseases, caused by bacteria and fungi. We have found numerous cases where, by the transfer of soil, a man got a parasite in his field which did him more harm than the bacteria did good. We have found cases where nematodes and root rot had been spread in this way in the South. So that we undertook to apply what had been tested in Germany, a method of distributing these bacteria in pure cultures. We perfected a very satisfactory method, so that anyone who wants to get the bacteria in pure cultures can do it without getting any parasites, and without expense.

Mr. COCKS. Is it fair to assume when you get a good stand of clover, when you examine that soil and you find that this clover has the little nodules, that it needs inoculation?

Mr. WOODS. No, sir.

Mr. COCKS. Is it fair to assume that they are present in half of the clover fields of this country?

Mr. WOODS. No, sir; I do not think so. It is only fair to assume it where you are introducing clover to a region where it does not grow naturally.

Mr. COCKS. For instance, I am on Long Island. I get a good stand of clover, and some of my neighbors do not. Furthermore, they do not put out seed enough. I throw out about twice as much seed as they do. I wanted to find out whether that clover I have there was really storing as much nitrogen as it ought to store under normal conditions.

Mr. WOODS. That could only be determined by an examination of the plants in the field. If you are growing on the Long Island soil, it is probably pretty well inoculated, because that soil is very sandy, and clover would not do as well as you say it has done with you unless inoculated.

The CHAIRMAN. How much further have you to go along these lines?

Mr. WOODS. I was going to say that our work has been with these clover bacteria, or improving the cultures we have already made. Last year we distributed cultures on cotton, and while they were very good, we found that if they got the least bit moist they would mould, and we lost at least 10 per cent of our cultures. We have now developed an improved method, namely, sending out pure cultures in nitrogen free nutrient solutions in hermetically sealed glass tubes. We find that this costs us only 1 cent a culture more than the cotton culture, so that we are sending out almost all our cultures like this [indicating glass tube], and there is a description, and directions just how to break the top of the tube off and to pour the contents into a pail. With that goes this little packet of salts. This will develop culture for two bushels of seed.

Mr. BOWIE. How would you increase that for the treatment of larger quantities?

Mr. WOODS. Just put in more of the salts. If a man says that he wants to treat ten bushels, we send him a larger amount.

Mr. FIELD. To inoculate 25 pounds, sufficient seed to plant one acre of alfalfa, how much would it take?

Mr. WOODS. This would inoculate 2 bushels of clover seed, or 120 pounds of seed.

Mr. FIELD. Of alfalfa?

Mr. WOODS. Yes, sir. The method of using this is very simple. You take a clean milk pail and scald it out and use some fresh, clean water.

Mr. FIELD. I understood you to say that that would be sufficient for about 60 pounds.

Mr. WOODS. No, sir; 120 pounds.

The CHAIRMAN. You calculate 30 pounds to the acre, do you not?

Mr. GALLOWAY. That is pretty heavy planting.

The CHAIRMAN. I put 24 pounds last year, and I was sorry that I didn't put more.

Mr. WOODS. These tablets simply contain the food for the bacteria.

Mr. WOODS. At almost any drug store.

Mr. FIELD. Suppose that I wanted to plant 10 bushels, instead of 2 bushels; that culture is enough, if I put in more salts. Where would I get the salts?

Mr. WOODS. At almost any drugstore.

Mr. BROOKS. What is that mixture?

Mr. WOODS. It is potassium phosphate (monobasic) and magnesium sulphate, and this third one, the stimulant, is phosphate of ammonia. That is simply used to put in the last twelve hours, to make the bacteria develop very rapidly. With package No. 1 we put in two teaspoonfuls of sugar. Of course everybody has that, so we do not send that out. This new method, we think, will eliminate the variation that we found in the dry cultures.

Mr. BROOKS. Do you use that on red clover?

Mr. WOODS. Yes, sir; on clover as well as other legumes.

Mr. COCKS. What part of the country is that used in? I can always get a stand of clover, but it dies out after the wheat is cut off.

Mr. WOODS. Sometimes failure is due to lack of inoculation. It may be due to soil conditions. With clover, inoculation is particularly valuable for the sandy soils of the Northwest. In alfalfa we find it particularly valuable right through this section here where the alfalfa has not been grown much, and the germ is not present.

Mr. COCKS. Can you use that down in the blue-grass country?

Mr. WOODS. Yes, sir; it works admirably there.

Mr. COCKS. How much farther do you want to go along this line?

Mr. WOODS. We are simply distributing these cultures, now.

Mr. FIELD. Where the soil is reasonably rich in nitrogen, does that add anything to the growth of the crop? Does it increase the size of the alfalfa—the growth of it?

Mr. WOODS. We have had some cases where it has done so and where it has increased the amount of nitrogen that is stored up in the crop—that is, the protein element has been almost doubled, as the food analysis showed. The analysis showed that inoculation had doubled the amount of protein.

Mr. COCKS. But the principal object here has been the storing of nitrogen?

Mr. WOODS. Yes, sir; there is another species of nitrogen-fixing bacteria that is in some respects more important than these nodule formers. This species fixes nitrogen in any soils containing lime and sugar or other form of carbohydrate which is available to these bacteria. I called the attention of the committee to this investigation two years ago, I think. We are getting along with this work and we find that these bacteria can be cultivated in the laboratory, and they

can probably be improved the same as the nodule formers have been, so that the nitrogen-fixing power will be increased.

Mr. BOWIE. Do I understand that that applies to any kind of crop?

Mr. WOODS. That will fix nitrogen with any crop that leaves roots, or a portion of the crop, in the soil, with sugar. That is true especially of grasses.

Mr. BOWIE. Would that apply to cotton?

Mr. WOODS. No, sir; the stalk dries up too quickly. It will apply to any grass that happens to be growing in the cotton fields. It will fix, to some extent, with corn.

Mr. BOWIE. How about sorghum, that has plenty of sugar?

Mr. WOODS. Yes, sir.

Mr. GALLOWAY. Johnson grass.

Mr. WOODS. Yes, sir; Johnson grass.

Mr. BOWIE. Sorghum is a very exhausting product for the soil.

Mr. WOODS. We have soils where these bacteria occur naturally. Limestone soils, for example, are very favorable and are likely to contain these bacteria, and our proposition has been to cultivate, improve, and distribute these bacteria just as we have the nodule formers. The amount of money that we have allotted to our physiological work is used very largely for this nitrogen work.

Mr. BOWIE. To what extent do you expend money on this nitrogen-fixing work?

Mr. WOODS. This work is costing us about \$5,000 a year; that is, this distribution work and this investigation I have just spoken of. For the physiological work, altogether, \$13,610 is the allotment. The rest of it goes to flax-retting organisms and water-purification works—the use of copper in water supplies.

The CHAIRMAN. Does that come under this item which reads: "To study and find methods for preventing algae and other contaminations of water supplies?"

Mr. WOODS. The work which we reported before has been extended to a great many large water supplies, and the copper treatment has proved very successful.

The CHAIRMAN. That is the Bordeaux treatment?

Mr. WOODS. They call it that, but it is not the Bordeaux. It is copper sulphate.

The CHAIRMAN. Copper sulphate?

Mr. WOODS. Yes, sir. We simply put in a sack the quantity necessary to destroy the organism present, taking into account the amount of alkali in the water and the kinds of fish, if any are in the water.

Mr. BROOKS. Will it remove the taint of alkali from the water?

Mr. WOODS. Yes, sir; but we do not put it in for that purpose. We put it in to take out the algae.

Mr. BROOKS. You say that you have made a number of experiments in large water supplies. You have had a number of unsuccessful tests?

Mr. WOODS. We have had no unsuccessful tests under the control of the Department.

Mr. BROOKS. Did you not have a lot of trouble at Springfield, Mass.?

Mr. WOODS. No, sir; not a bit of trouble. The Springfield authorities were advised to make a treatment of 1 part to 8,000,000 for destroying contaminating organisms in a reservoir, which, I think,

was not at the time in use for drinking purposes. The treatment was perfectly successful. We did not kill any fish, and the organisms were knocked out. But somebody up there—not at Springfield, however—wanted to try a different experiment, and they put in five times the amount of copper we recommended and killed a large number of fish. The experiment was tried, as reported to us, to determine the rate of distribution of copper in water and for no other purpose in that particular case.

Mr. BROOKS. What does that treatment do with typhoid germs?

Mr. WOODS. It knocks them out completely. And you can treat sewage with it for this purpose.

The CHAIRMAN. Then this is one of the great discoveries of the age.

Mr. WOODS. It is being used on a very large scale by some water departments and health departments. They have used it in over 50 of the largest reservoirs in the United States.

Mr. COCKS. I wonder if Brooklyn has been treating with it. There is a great field for it there.

Mr. BROOKS. They keep very still about it.

Mr. WOODS. Yes, sir. No matter how harmless it is, I do not care what it is, if people get the idea that you are putting something in the water, they will raise a great howl.

One of the simplest methods of purifying drinking water of typhoid bacteria is to take a piece of copper foil and put it in your water cooler—about five square inches to each quart. In five or six hours the typhoid bacteria will be dead and the water perfectly safe to drink, even though it might have been contaminated with sewage. The board of health of Philadelphia has almost unanimously recommended the treatment of water from the river there, and they are ready to treat it; but there is a chemist down there who examines the water chemically, and he is opposing the use of copper on the ground that he thinks it is a deadly poison. Every well-informed physiologist knows that it is not, but that has simply held that thing up in Philadelphia.

Mr. BROOKS. There is a popular idea that copper is poison.

Mr. WOODS. There is not a case of copper poisoning on record anywhere.

The CHAIRMAN. There is a common impression that if you let a lot of verdigris get on your kitchen utensils it will poison the food. Is not that so?

Mr. WOODS. That is the belief, but it is not so. It is an emetic, but it is not poisonous.

The CHAIRMAN. Does this use of copper in drinking water affect the taste of the water?

Mr. WOODS. No, sir. If used properly, you can not detect it at all.

Mr. GALLOWAY. The whole basis of our copper treatment for plant diseases came from an accidental discovery. A chemist who was investigating for fungus spores used water from a well where he had a copper pump, and he found that those forms would not develop and would not live in that water.

The CHAIRMAN. You know it is simply a plain solution of copper that is eradicating the foot-rot in sheep.

At 2.10 o'clock p. m. the committee adjourned until to-morrow, Tuesday, January 23, 1906, at 11 o'clock a. m.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Tuesday, January 23, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

STATEMENTS OF MR. GALLOWAY AND MR. WOODS—Continued.

The CHAIRMAN. I believe the next item is on page 14 of the Book of Estimates, which reads as follows:

Grain investigations.—For all expenses, including the employment of labor in Washington or elsewhere; to enable the Secretary of Agriculture, through the Bureau of Plant Industry, to carry on special investigations, in cooperation with the State experiment stations, of the conditions of grain production in the United States, and of the means of improving the same; to develop varieties suited to semiarid districts and high altitudes; to determine the best methods of cultivation of grain for different districts; to make possible a further extension northward of winter grains by increasing their hardiness; to determine the cause of the deterioration of grains from the milling standpoint, in cooperation with the Bureau of Chemistry; to investigate the conditions affecting the quality of stored grain and grain in transit.

What has been the cause of the necessity of all this? What has called the attention of the Department to it?

Mr. WOODS. The whole grain situation, do you mean, or just the last item?

The CHAIRMAN. The whole grain situation.

Mr. WOODS. The grain interests of the country are very large and the same difficulties in the production of high-grade cereals are met with that we have in the production of any other crops. Many of those difficulties are due to diseases; others are due to the influence of soil conditions upon the quality of the grains, and others appear to be due to the changes that gradually take place in the grain itself. There is a sort of running down or modification, probably due to the changed qualities of the soil and the influence of climatic conditions.

The grain in California that was so good a few years ago is beginning to be modified by some unknown cause, resulting in an excessive amount of starch on the outside of the kernels, making them white and of less value, and the same is true of the spring and winter wheats in the northern Mississippi Valley region. It is the determination of the causes of changes of this kind and the introduction of new types of grain of better producing power in areas where the grains now cultivated are not satisfactory upon which we are engaged. For instance, the spring wheats in the eastern Dakotas and northern Nebraska and in portions of northern Minnesota and Iowa are low yielders, although they make a fine quality of flour. The winter wheats make just as good a quality of flour and are very much better yielders, but they will not grow well in latitudes north of the central portion of Nebraska, Iowa, Wisconsin, and southern Minnesota. So that we have been trying to secure some hardier winter wheats from Russia, and by selection adapt those wheats to the conditions existing in our northern wheat belt, where we are now confined to the spring wheats.

The CHAIRMAN. Do you not think that is largely due to the deterioration of the wheat quality of the land?

Mr. WOODS. That may be true in part; yes, sir.

The CHAIRMAN. They have wheated and wheated these Dakota lands until they have taken the wheat quality out of them. It seems to me it is about as much a matter of cultivation as anything else.

Mr. SCOTT. I will tell you, however, that if wheat has once deteriorated, from whatever cause, whether lack of proper food in the soil or anything else of that sort, it can not be bred back again to its pristine quality by feeding up the soil.

Mr. GALLOWAY. No, sir.

Mr. SCOTT. You have to find a new variety.

Mr. WOODS. We find that our new varieties do very well on these same soils that are supposed to have deteriorated.

Mr. SCOTT. If you are not taking this matter up in any special order, I would like to call your attention to a remark you made yesterday about crossing the durum wheat with other varieties. What general purpose did you have in view?

Mr. WOODS. To get rust resistance, and drought resistance, and increased protein content.

Mr. SCOTT. What do you find in the matter of the yield? As I understand, the durum wheat is not a very prolific variety.

Mr. WOODS. It is more prolific than any other wheat that we have.

Mr. SCOTT. I thought that the advantage of it was that it would grow with a minimum of moisture.

Mr. WOODS. It grows with a minimum of moisture, and it yields nearly double what a spring wheat would yield.

Mr. SCOTT. How does it compare with the spring wheat under spring-wheat conditions?

Mr. WOODS. Its yield is higher.

Mr. SCOTT. What do you find to be the result when you cross durum with another variety of wheat?

Mr. WOODS. We have not cultivated the hybrids under field conditions.

Mr. SCOTT. Does the durum wheat lose its rust-resistant qualities and its drought-resistant qualities if it is crossed with these other wheats?

Mr. WOODS. In some hybrids it is lost; in others it is not lost. Some think that the durum wheats are already as good bread wheats as the spring wheats.

Mr. SCOTT. The durum wheat yields as heavily as other varieties, and will resist drought, and will resist rust. Why is it not a good seed to plant all over the wheat belt?

Mr. WOODS. The reputation of Minneapolis flours has been built up on spring and winter wheats, and those big flour men—the millers in Minneapolis—are desirous of having these other types of wheat, and then, of course, the durum wheats are best adapted to the drier areas.

Mr. GALLOWAY. They deteriorate when brought into the more moist climates.

The CHAIRMAN. Then the flour made from the Durum wheat still has a little of the macaroni characteristic, and the bread is tough, and it does not sell well. That is the reason they want the other wheat, because it makes better bread?

Mr. WOODS. Yes, sir; but you can get more out of the Durum wheat than out of the other wheats.

Mr. GALLOWAY. It is preeminently a dry-land wheat.

Mr. WOODS. You have to use less flour in making bread from the Durum wheat. You can make more loaves to the barrel from Durum wheat flour.

Mr. GALLOWAY. A year or two ago, in order to test this matter, we sent samples of Durum wheat flours, and of the flours from the typical wheats of the Northwest, to a number of bakers throughout the country, and we labeled them only by numbers, and we asked that they be made into bread, and that they should report to us as to the advantages or disadvantages of each number. It was about an even thing when the reports came in. In many cases they could not distinguish between the two. In many instances the breads from the Durum wheats were a little darker, but they have a more nutty flavor.

While I am speaking, I would like to mention one fact in connection with all this problem relating to the improvement of our cereals, and this is their gradual deterioration. It is a fact that even under the best farming conditions, not only with the cereals, but with other crops (the potato, for instance), they will run out. The most striking instance is in California, where they can no longer profitably make bread from their wheat. Now, the millers are asking that something be done to secure a higher protein content. The methods of harvesting and planting and cultivation have had much to do with this deterioration. They have gone on under an extensive system of harvesting, and planting and cultivation have had much to do with this deterioration.

The CHAIRMAN. What have you done about that? You have been authorized to work on that during this last year. What have you done along that line?

Mr. WOODS. We have been testing varieties for the purpose of extension of the winter wheat area. We have been testing a variety of Russian wheat known as "Kharkof" in northern Nebraska and South Dakota, and even in North Dakota, and it has proved a hardy winter wheat and an excellent yielder in all those sections, and by selecting for perhaps a year or so more we can obtain strains of this wheat that will give a good winter wheat yield in these regions where they are now confined practically to spring wheat, and the yield of the winter wheat is 4 to 5 bushels more than that of the spring wheat. In the South we have been experimenting further with the Tennessee winter barley in cooperation with the Tennessee experiment station. That has proved very valuable throughout the South, even in eastern Texas. Of course we are selecting that for still greater adaptation to conditions that vary from those in eastern Tennessee and still farther south. This winter barley has also proven valuable much farther north than we thought it would. It has done very well even in Kansas. The Hankau hulless winter barley has also given excellent results, especially in the region of Dallas, Tex., where it is very early in maturing.

Mr. FIELD. What is it used for, principally; for grazing?

Mr. GALLOWAY. It makes a very valuable winter grazing crop.

Mr. WOODS. And also a very good barley. Another important line of work we started several years ago in the stations on the Great Plains belt has been in testing the drought resistant grains, including Durum wheats, selecting varieties that are better adapted to conditions in the semiarid belt. There are quite a number of varieties of Durum wheats, and the experiment stations have been working with us in improving

these by selection and adapting them to the various conditions that exist through the semiarid belt, including eastern Colorado and western Nebraska, and North and South Dakota, Indian Territory, Oklahoma, and western Texas. In that connection we have started the work on cultivation methods to test the methods of cultivation of cereals, as well as other crops that are necessarily grown in rotation with them, and we have in cooperation with the State experiment stations established a series of substations—12 or 14 altogether—extending from North Dakota south into Texas, and at these stations we expect to work out some of the factors in relation to cultivation and the effect of cultivation on the production not only of cereals but of other crops.

Mr. SCOTT. At these substations you are studying what they call dry farming?

Mr. WOODS. That leads into a very important branch of dry farming, and for a number of years we have been looking out and trying to get good crops which are adapted for agricultural use in this area, which for a number of years at a time may have a very low rainfall, only ten or twelve inches. The cultivation methods there are mainly for the purpose of conserving the moisture.

Mr. SCOTT. And you are conducting experiments all the way down from the Dakotas to Texas which involve the art of dry farming?

Mr. WOODS. Yes, sir.

Mr. SCOTT. I asked that question particularly because there is a bill before this committee to make a special appropriation for carrying on experiments in dry farming, and it occurs to me that if the Department is already doing that work in such a way as to develop whatever the facts may warrant it would not be necessary to make a special appropriation for it.

The CHAIRMAN. That question of cultivation comes under this item. What are the experiment stations in all these States doing?

Mr. WOODS. They are cooperating with us very heartily.

The CHAIRMAN. And are you working in cooperation with them?

Mr. WOODS. Yes, sir.

The CHAIRMAN. Where are you making actual experiments—experiments in the actual growing of the wheats?

Mr. WOODS. Those experiments are being conducted at Dickinson and Edgely, N. Dak.; Highmore, S. Dak.; North Platte, Nebr.; Hays and Garden City, Kans.; Channing and Amarillo, Tex., as well as several other points between the 98th and 104th meridians.

The CHAIRMAN. That is under the control of the experiment stations, and the Department is acting in an advisory capacity every year and furnishing the money to help the experiments along?

Mr. WOODS. Yes, sir. We put an expert there to carry out our part of the work. The stations assist by furnishing the land and furnishing the ordinary labor and the buildings, and so forth, and we look after the scientific part of it.

Mr. SCOTT. I want to say right here that the Kansas Experiment Station has one experiment farm at Manhattan, Kans., a little east of the central line of the State, and another at Fort Hays, a part of the old military reservation, which is far enough south to afford good ground for an experiment station in the arid belt.

Mr. FIELD. In connection with this experimental work that you are carrying on from the Dakotas down to Texas, does that embrace irri-

gation from surface water, or by the use of artesian wells? Is that within the scope of your experiments?

Mr. WOODS. No, sir; that is not necessarily included, except as it comes up in the management of any ordinary farm. But the use of water for irrigation we have not touched, because that is a distinct proposition from the object of getting crops which will grow on soils that can not be irrigated. We have confined our experiments to those places where irrigation is not practicable.

Mr. FIELD. In other words, to natural conditions?

Mr. WOODS. Yes, sir; three-quarters of the arid west will have to be provided with crops that will grow without irrigation and stand the drought.

Mr. BROOKS. In respect to dry farming, do you think it is going to be possible, over wide areas, to grow potatoes and wheat and the staples over eastern Colorado, for instance?

Mr. WOODS. No, sir. We have hopes of finding a potato that will grow with 9 inches of water. A small irrigated patch in connection with a dry farm is a very good thing and very necessary in many instances, but the irrigation end of the proposition is carried on by another office.

Mr. BROOKS. That is, by a different Bureau of the Department?

Mr. WOODS. Yes, sir.

Mr. BROOKS. It is a different series of operations?

Mr. WOODS. Yes, sir.

Mr. BROOKS. You are confining your work to plant selection and plant culture?

Mr. GALLOWAY. And plant testing.

Mr. WOODS. Yes, sir.

Mr. BROOKS. And you are trying to find plants that will adapt themselves most readily to that habitat? That is the extent of your work, and you are not going into the questions of the conservation of water, the conservation of surface supplies, or soil conditions, except so far as they relate to the plant culture?

Mr. WOODS. That is it.

Mr. BROOKS. So that there is a very wide field of arid-land investigation that you are not covering?

Mr. WOODS. Exactly; except in this way, that where you can get your water you know you can grow your crops.

Mr. BROOKS. Of course you know that the matter of irrigation is a science almost by itself, and that we know very little about it as yet; that the amount of water applicable to certain soils, and all that sort of thing, is very much a new subject?

Mr. WOODS. There is a phase of it touched that is necessarily physiological, and that is the determination of the effect of different quantities of water on fruits and crops.

Mr. BROOKS. It is true that some crops require irrigation in the spring and summer and others in midsummer and some in the fall?

Mr. WOODS. Yes, sir.

Mr. BROOKS. And some plants will thrive with one irrigation, whereas others require three or four?

Mr. WOODS. Yes, sir; the general practice in the West has been to overirrigate.

Mr. BROOKS. To spoil the land and waste the water?

Mr. WOODS. Yes, sir; to waste the water and to spoil the quality of their fruits. Fruits are insipid when they are overirrigated. They also injure the roots of the plants, and make them subject to root diseases. There is a great field there which we have hardly had opportunity to touch.

The CHAIRMAN. Does that come under your Bureau?

Mr. WOODS. Yes, the plant end of it. Of course the irrigation propositions in themselves are mainly engineering propositions, that is the way it seems to me; but the plant end of the proposition is a very important one, which has not received the attention that it should receive.

Mr. GALLOWAY. We have not developed any agricultural irrigation in this country as yet.

Mr. BROOKS. It is true that there is a vast field opened as to the limited application of water.

Mr. WOODS. In regard to the application of water and its adaptation to plant growth?

Mr. SCOTT. In your judgment, Doctor, have your experiments in dry land farming proceeded sufficiently to warrant you in the belief that it would be practicable for a man to make a living in this semiarid country where he has nothing but his farming to depend upon?

Mr. GALLOWAY. Our experiments have not proceeded far enough to warrant us in saying that.

Mr. FIELD. Is it not true that the rainfall has gradually increased in quantity, going toward the west, and much of that semiarid country in the last two or three years has proven to be pretty fair farming land?

Mr. GALLOWAY. Yes, sir; but these years have been abnormal.

Mr. SCOTT. I would like to make this statement to go in the record. I have lived in Kansas all my life. I was born there, and I have seen three or four of these cycles. I have seen the homesteaders lured out on those western plains by three or four years of abundant rainfall, and when they had gone out and spent their little all in getting their farms ready for a crop then the rains would diminish and practically cease and they would go broke. And that was the cause of the collapse of the boom in Kansas in 1890. It was just that sort of thing. And the same thing is happening right now. For the past three or four years they have had a rainfall which has produced fair crops of corn clear out to the Colorado line.

Mr. WOODS. And wheat was fine out there, too.

Mr. SCOTT. Yes. And there is only this thing that the settlers out toward the western part of the State do strenuously contend—and very careful, conservative men, too—and that is that with the cultivation of the country and the breaking up of the soil and the planting of trees and things of that sort, the rainfall is better distributed than it used to be, and that it comes more regularly throughout the year, and the storms do not come with such intensity.

Mr. GALLOWAY. And the water is better conserved.

Mr. BROOKS. Do you not think it is possible that with careful study of the methods of irrigation and plant culture it is possible to successfully farm a considerable portion of that country?

Mr. GALLOWAY. Yes, sir.

Mr. BROOKS. But would you say that the same methods, or approximately the same methods, would apply that apply farther east?

Mr. GALLOWAY. No, sir. And, furthermore, Mr. Chairman, the fact is evident that we are gradually encroaching on those arid lands with crops better adapted to the dry conditions. We have proved that alfalfa, when once started, has the power of drawing moisture from deep down, and after alfalfa—by the combination of the alfalfa with another crop—you can produce a crop like the Kaffir corn.

Mr. WOODS. Another thing. It seems to me while we are working there, doing a little along these lines, slowly, there is an opportunity of expanding the work on the basis of what we now have, and that some very good work can be done, so that we will be in a position to advise methods and crops and rotations of crops that will help some of these people who are going to be caught there. I have lived in Nebraska almost all of my life, and I understand how these people think and do about this.

Mr. FIELD. How is it that they go out there and put themselves in this position?

Mr. WOODS. The farmers think that they can use the same crops that they used in the East, and that they can farm with the same methods, and we have got to give them the proper crops and proper methods. We have now the wheat and the alfalfa that will grow there, and also the emer.

The CHAIRMAN. Is that the Turkestan alfalfa—or what is emer?

Mr. WOODS. Emer is a grain which has a hull like barley or oats.

The CHAIRMAN. Where do you bring it from?

Mr. WOODS. From Russia.

Mr. SCOTT. Do they make bread out of it?

Mr. WOODS. They do in Russia, but I do not think they do here. These people along the edges of the desert of Sahara and in the drier portions of Russia have, through centuries of actual experience, developed crops suited to their conditions, and we are getting those crops and methods now and adapting them to the slightly different conditions here; so that I can prophesy, I think, with perfect safety, that we can increase, in the course of time, after careful investigations, the productivity of all these lands, and make dry-land farming without irrigation a success.

The CHAIRMAN. That is naturally a slow process?

Mr. WOODS. Yes, sir. We can recommend cereals and forage crops and fruits which will grow throughout that region with the ordinary rainfall.

The CHAIRMAN. Arid or semiarid?

Mr. WOODS. The semiarid, between the 104th meridian on the west and the 98th meridian on the east.

Mr. BROOKS. Within what is known as the 13-inch rain belt?

Mr. WOODS. Yes, sir.

Mr. BROOKS. Are there arid regions in the South?

Mr. WOODS. Yes, sir; down in Arizona, where they do not get any rain at all.

Mr. BROOKS. Where do you draw the line? What do you call an arid country, and what a semiarid country?

Mr. WOODS. A country which has in the neighborhood of 13 inches of rain we call semiarid.

Mr. BROOKS. Where it goes below that you call it arid?

Mr. WOODS. No, sir; it is not called arid until it gets, probably, below 8 inches. It depends on how the rainfall comes, though. If it

comes all at one time, it does not do much good, and that country is practically arid.

Mr. BROOKS. Above 20 inches; that is a hopeful proposition?

Mr. WOODS. Yes, sir; where you get 20 inches. It is the occasional year that runs down to 10 inches that makes the hard times. Sometimes in Nebraska and western Kansas that condition continues for three years at a stretch.

Mr. BROOKS. How long would it be after the water supply failed before they would begin to suffer?

Mr. WOODS. With ordinary crops they begin to suffer when it gets below 18 or 20 inches. With durum wheat the water can go down to 9 inches, and the wheat will pay no attention to it at all, but will grow right along.

Mr. BROOKS. How low does it run in the Wasatch?

Mr. WOODS. I have seen statements that there was no water at all in many places, but, of course, there is some. There is no hope for a country without any rainfall, except where irrigation is possible.

Mr. GALLOWAY. In Central America one of our men who was looking up things about the boll weevil found a very interesting state of affairs. The Indians who have lived there in that country for thousands of years, and are practicing the same agricultural methods that they practiced when the Spaniards went there—we have the Spanish records three or four hundred years old—have by hard experience evolved a cropping system. Those natives are without intelligence, and hardly know enough to live in communities; but they have learned certain cropping systems, and they profit by their experience. They have corns which they bring out only in dry seasons. Their climate runs in cycles. If it is going to be a wet season they bring out the corns that have been adapted to wet seasons, and if it is a dry season they plant those corns which are adapted to stand the drought.

The CHAIRMAN. They have shown a certain amount of intelligence, after all.

Mr. WOODS. We are trying to make available to the American farmer the information that it has taken thousands of years for these people to work out by experience, and a great deal of it is very valuable to-day. There seems to be hardly any proposition that has not been worked out in some way, somewhere.

Now, the last proposition here is, "To investigate the conditions affecting the quality of stored grain and grain in transit." Under this appropriation we have done only a very little, and that is in cooperation with the seed laboratory. That is a sort of a double-headed proposition. One laboratory attacks the problem from the cultural standpoint, determining the conditions of the grain as affected by the climate, soil, and the kind of seed used, and the other line of investigation deals with the amount of moisture in the stored grain and methods of storage that the grain has to undergo, especially in ocean transit. This has been under the appropriation for the seed laboratory and considerable progress has been made on this, but it will be discussed under seed-laboratory work. Four hundred dollars or five hundred dollars has gone for the line first mentioned, viz, cultural, etc. That practically covers the cereal work, but there are two or three things relating to other lines that we skipped yesterday that I would like to call attention to.

One of these things is the work on bitter rot of the apple. A few years ago there was a tremendous loss, extending from the Mississippi Valley east into Virginia, a destruction of fruit estimated at \$10,000,000 at least. This loss was due to the bitter rot, which attacks the apple especially in wet years. This disease has been studied by the stations and by the Department off and on for many years, and this last season we have finally discovered the cause of the previous failure to control the disease. We have found that the infection period was very much earlier than anybody thought, and that in order to control the disease the spraying must begin within thirty days from the time the petals fall, and if spraying with Bordeaux mixture is kept up and done thoroughly, the apple crop can be protected from the bitter rot as completely as from any of the other troubles that we have control of. Our experiments in this line have been remarkably successful.

The CHAIRMAN. Would you do that every year?

Mr. WOODS. Every fruit year in each district. If it is an off year it might not pay, because many of the orchards do not bear fruit except every other year.

The CHAIRMAN. But if the spraying itself should be followed by a very dry year it would not affect it?

Mr. WOODS. There would be sufficient injury to warrant spraying every fruit year, because the cost is so slight. And it increases the appearance and the keeping quality of the fruit. The greatest loss from the bitter rot in Virginia was from the destruction of the Albemarle Pippin, which is an export apple, and which is very sensitive to the bitter rot. For several seasons it almost completely destroyed the crop, except that produced on the mountains. When we went down there to spray it was the hardest work in the world to get anybody to cooperate with us. The apple growers said that they had tried spraying and that it was a waste of money.

The CHAIRMAN. It was a question of the time when you should do it?

Mr. WOODS. Yes, sir. We went into an orchard there and the people watched us and they saw that orchard, thoroughly sprayed according to our directions, yielded fully 95 per cent of first-class apples that sold at a very high figure because most of the fruit that was not sprayed rotted. One old fruit grower who would not listen to us in the beginning when he visited the experiment cried because he had not sprayed his orchard. In the case of bitter rot we have worked out all that it is necessary to work out from the scientific standpoint, and the thing that remains to be done is to go into the orchards and show the people how to spray and to get them to spray, and that is the hardest proposition of all.

The CHAIRMAN. Through all the fruit districts they are spraying now pretty freely?

Mr. WOODS. They are up in New York.

Mr. SCOTT. Is it not common to spray within less than thirty days after the petals fall to secure against any attack?

Mr. WOODS. No, sir; they spray just after the petals fall, and sometimes just before.

The CHAIRMAN. A good deal of the trouble is because the spraying is done by men who go around with their machines just as the thrashing machines go about the country, and very often they do not arrive in time.

Mr. WOODS. And sometimes they are careless in making up the mixture, and they get poor material, and the farmers claim that the mixture burns the fruit and makes it lopsided.

The CHAIRMAN. Will you put into this report the receipt for that Bordeaux mixture, and whatever else you think essential for good orcharding? I know that you have published it many times, but you can not publish that too often. Every county paper ought to publish it every spring. It ought to be spread in big type in the month of March in every weekly newspaper.

Mr. WOODS. The best type of Bordeaux mixture, that which we find the best for the spraying of ordinary apple and fruit trees, except the peach, is 5 pounds of copper sulphate and 5 pounds of quicklime of first-class quality to 50 gallons of water. That makes a mixture that is a little weaker than the standard Bordeaux, which is 6 pounds of copper and 4 pounds of quicklime to 50 gallons of water; but we find that by the use of these proportions you get a mixture which is fully as effective and has enough lime in it so that the copper does not burn the fruit, which is an important proposition. We have a new Farmers' Bulletin going into this subject fully ready for publication.

Mr. BROOKS. How many trees would 50 gallons spray?

Mr. WOODS. Fifty gallons of mixture would spray about 10 trees ordinarily. It depends on the size of the trees and on how much of the mixture is wasted, but ordinarily it will spray 10 trees if it is done thoroughly.

The CHAIRMAN. What is the cost of that 50 gallons of mixture?

Mr. WOODS. It will cost less than a cent a gallon. It will cost about the same to apply it.

The CHAIRMAN. Fifty cents for ten trees; 5 cents apiece?

Mr. WOODS. We usually estimate that it will cost 5 or 10 cents to spray a tree thoroughly.

Mr. BROOKS. That is including the labor on it?

Mr. WOODS. Yes, sir.

Mr. COCKS. Do you think any of these people that are going around for business in that line can afford to spray for that price? They always talk about 50 cents a tree.

Mr. WOODS. That is a big price.

Mr. COCKS. Sometimes you have big trees. Suppose you take a big tree 40 or 50 years old?

Mr. WOODS. That is a big price; but it would be better to pay even that high a price than not have it done. Many of the people who go around spraying do not know how. We have had it illustrated also in our pear-blight work in California, which I have not yet discussed.

The CHAIRMAN. In the fruit districts they have learned how to spray. Where they do not know how to spray is where the fruit is grown only in the little orchards which the farmers have for their own use. But in the real fruit districts in the counties in New York where they grow fruit commercially they know how to spray. Do they use the same mixture on the pear tree?

Mr. WOODS. Yes; the same mixture will work on scab, but not with pear blight. That is a disease which enters through the flowers, and is carried by bees and flies. The recommendation has always been to cut out the diseased wood. The difficulty, however, is to cut it out thoroughly, not leaving any infected wood to start the disease the next spring. If infected wood is left the bacteria break out in sugary drops

in the spring, and bees and flies carry this from tree to tree. It is in this way that the disease is carried over winter. If a man will go into the orchard and cut out that wood and use corrosive sublimate on the wounds, so that they are not reinfected, it will exterminate the pear blight. This has been demonstrated in Georgia and in California. At the request of the people of California and the experiment station we are now supervising, with five of our expert pathologists, united with six or seven from the station, this pear-blight extermination work, and we are sweeping the pear blight out of the great pear districts of the State.

One of the difficulties we had to meet was that there were at one time quacks traveling around the State claiming to eradicate this disease, and some growers were induced to let them go into their orchards and cut out the blight, but no benefit resulted; so that when we went there we found the greatest difficulty in getting those people to listen to us. Even with the powerful State machinery they have out there for the eradication of fruit disease, we had great trouble. They would not have anything to do with it until we showed that the previous cutting had been wrong, and that they might remove all this ordinary blight on the twigs, the twig blight, and if they left the hold-over blight in the larger limbs or trunk their work was useless. We showed them that they might leave the twig blight, which dies anyway, if they would only cut out the hold-over blight that carries the disease over winter. That is a comparatively simple proposition. You have simply to show the hold-over blight to a man so that he can recognize it. You can not describe it, but if you show it to a man he will recognize it at once.

Mr. COCKS. The thing of great importance in all these agricultural matters which you recommend is the field demonstration rather than the literature that may be sent out?

Mr. WOODS. Yes, sir.

The CHAIRMAN. The ocular demonstration?

Mr. WOODS. Yes, sir. These scientific matters have to be worked out; but if they are worked out and laid on a shelf, as is often the case if the results are simply published, the money is wasted. We must give ocular demonstrations to the people and be sure that they understand our new methods, and keep at them until they adopt them.

Mr. BROOKS. You have to go out and do it?

Mr. WOODS. Yes. They will not learn it from a bulletin. A similar condition exists in the southwestern fruit districts of Colorado. The pear blight has got in there and nearly cleaned out the Bartlett pears, and we are under pressure from the Colorado people from all sides to do some demonstration work there.

Mr. CANDLER. What is to keep it from returning if it gets in through the flowers?

Mr. WOODS. It is carried by the bees, and this holdover blight breaks out in the spring in little exudations of sugary material, and the bees visit those places to get the sugar, and then visit the flowers, and thus carry the infection. If you can cut out the source of infection, you can stop the spread of the disease; this is simply cutting out little places on the trunk and larger limbs. That is all there is to it. The blight is all dead in the twigs by spring.

Mr. CANDLER. If it is done this way it will not return next year?

Mr. WOODS. No, sir; unless it is carried from the outside; and the bees will not as a rule carry it more than a mile or 2 miles.

Mr. CANDLER. There was a man down in my country who had a fine orchard, and he had put about all the money that he had into it, and this blight came along and utterly ruined that orchard, and he lost all that he had.

Mr. WOODS. It was a long time before the blight attacked the pears in southern California. Now the trees are almost all killed out of the southern districts.

Mr. CANDLER. You think that you have absolutely controlled that?

Mr. WOODS. Yes, sir. In California we are starting in the north and sweeping the disease to the south. Our pathologists are directing the work, and the object is to demonstrate the practicability of such a thing, as well as to save the orchards. The station is cooperating in the same work. They got a special appropriation from the State for the work, and the people themselves, out of their own pockets, have donated \$1,200 and turned it over to us to send four more inspectors out there, and we have sent them.

Mr. FIELD. The presence of this disease, this blight in the pears, is indicated by the leaf turning brown?

Mr. WOODS. Yes, sir, and the twigs dying back.

Mr. FIELD. And after the fruit is gone, in the fall or winter, can you always distinguish the disease?

Mr. WOODS. Yes, sir. If you will examine the tree closely you will see that the top is partly dead, as if it had been struck by lightning or fire. If you examine the twigs you will find there is a plain demarcation between the dead and the healthy tissue, and there is a sharp or distinct line where the healthy wood begins.

Mr. FIELD. How far back should that be pruned?

Mr. WOODS. Just below that line. Where the disease runs in through a fruit spur, which is allowed to develop on a large limb, you will notice in the limb there is no such demarcation between the healthy and the diseased wood. That is an absolute proof that the germs are alive, and if you leave that, in the spring there will be little cracks formed, and bits of sugary material will come out, and the bees go to that first in the spring, because it is the only thing they can get at that time, and they get thoroughly inoculated with the bacteria, and when they visit the flowers a little later they infect them, and so inoculate the tree with the disease.

Mr. FIELD. I did not know that anything had been found that would control the pear blight.

Mr. WOODS. The method I have described is effective, and it is not any more expensive than spraying. It simply requires careful attention to the details of cutting out, and with a realization that if you cut a knife into one of the infected places and then cut a healthy limb with the infected knife, it will inoculate that limb. It is a surgical proposition, and it must be done antiseptically; but that is so simple that after a man is shown how, he wonders that he did not know how to do it before.

Mr. GALLOWAY. When we began to demonstrate the contagiousness of this disease, a man offered us his orchard for experiment. He said, "It is not infectious, and I am not afraid of any contagion." He said that it was due to frost. Our men sprayed one tree, and in a few days we got a frantic appeal from that man to please come at once and treat

those trees. He said, "They are dying, and for heaven's sake take this thing out." That man has been made a thorough convert to the proposition that the blight is contagious, and he is one of the best men that we have now in forwarding this propaganda.

The CHAIRMAN. I think we have covered the work of the pathological office.

Mr. GALLOWAY. Yes, sir.

Mr. LEVER. I want to ask Mr. Galloway one question about the experiments made at Florence, S. C. I am just in receipt of a resolution passed by their chamber of commerce asking for a continuation of the work down there. What is the work at Florence?

Mr. GALLOWAY. That comes under another office.

The CHAIRMAN. I want to ask you the question that we ask you so often. I see that you have a small increase of appropriations, something like \$8,000. The old work is so completed that you can divert enough of the money which was being used for that to this use for the further uses that you want?

Mr. GALLOWAY. I think we have our hands so full with these other matters that this \$8,160, which is for the tobacco work, is essential for that extension.

The CHAIRMAN. Has not any of the other work been completed, or nearly enough completed, so that the money can be diverted from it to this use?

Mr. GALLOWAY. I do not think it has. You have listened to what Mr. Woods has said in regard to the problems we are investigating. It is simply a question of pushing those problems along.

The CHAIRMAN. The difference between the \$25,000 you have appropriated for the spray investigations, and the \$8,000, is \$17,000. That is \$17,000 that has been saved from work completed. Otherwise you would want an appropriation of \$25,000? Is that right?

Mr. GALLOWAY. I do not know that that is exactly the situation. We had not made our plans for this work. That work is not completed.

Mr. WOODS. No, sir; that is only started. We only got it last year.

The CHAIRMAN. You only ask for an increase of \$8,000 for the whole office, including that amount. Am I not right in my figures?

Mr. WOODS. It is only \$8,000 increase for vegetable pathology, including the \$25,000 appropriated last year for cereals.

The CHAIRMAN. Eight thousand dollars increase for the office of vegetable pathology, including that. If it is only \$8,000, you must have taken \$17,000 from these other subjects, to make up the \$25,000. Do you see the point?

Mr. GALLOWAY. No, sir; there is an actual increase over all.

The CHAIRMAN. Yes; of \$8,160. Now, if you devote \$25,000 for this cereal work, will not the difference between \$25,000 and \$8,000 leave \$17,000? Where is that coming from?

Mr. CANDLER. Was not the appropriation last year \$25,000 for this work?

Mr. GALLOWAY. No, sir; that \$25,000 was a separate item, last year.

The CHAIRMAN. It was included in the Bureau of Pathology. Your total for the bureau is \$8,160 more than last year?

Mr. GALLOWAY. Yes, sir.

Mr. WOODS. Regarding these projects, the way the bill is worded, the way we discuss these things sometimes it might look as if we did

the same thing rights along. But take, for instance, the pear blight. We are no longer doing any investigation work on the pear blight, because we have finished that phase of the work. But we are doing demonstration work; and it is the same with the bitter rot, and many of our other investigations which have passed through various stages of development.

As soon as one stage is finished, the money goes to the next step to make that a settled proposition. It should be remembered here in discussing the various items, that until we reach the last step and the proposition has been put into actual use and is understood, we have not finished the work.

Mr. SCOTT. If this appropriation was not increased, how much would you have available for the tobacco work?

Mr. WOODS. About the same as we have this year—about \$10,000.

Mr. SCOTT. You want only \$8,000?

Mr. WOODS. Yes, sir; we want that increase if we are to extend the work through Kentucky and Ohio, and where it is as much needed as it is in Connecticut. We can not stop the work in Connecticut without losing a lot of valuable work that has already been started, but not yet completed there. It will require possibly two years more in Connecticut.

Mr. SCOTT. If you continue that Connecticut work, will not that work be applicable to the other sections of the country?

Mr. WOODS. Only in a general way, because the types grown in Connecticut are different types from those grown in Ohio, Indiana, and Kentucky.

Mr. HENRY. It is mostly used for fillers and binders.

Mr. WOODS. The tobacco interests in these other States are very anxious to have us come there and do the same thing for their types of tobacco that we have done in Connecticut. It is a different line of work, and we would have to have the money for that.

Mr. GALLOWAY. We have arranged to do that work in connection with the experiment station. The same is true in Ohio and Kentucky.

Mr. HENRY. The types of tobacco in Connecticut would not be adapted to Kentucky and Ohio?

Mr. WOODS. No, sir; but they would be adapted to Florida, and there we are now working.

The CHAIRMAN. Let us pass on now to the pomological work, page 18 of the bill, which reads "Investigating, collecting, and disseminating information relating to the fruit industry, the collection and distribution of seeds, shrubs, trees, and specimens."

Mr. GALLOWAY. The first clause is "Investigating, collecting, and disseminating information relating to the fruit industry." That is in relation to what might be called general work of the office, a very extensive work, involving correspondence with fruit growers all over the United States in reference to orchard planting and handling orchards, that is, administrative work, generally. That constitutes the chief line of investigation.

Under the first clause is of course involved the collection of data that can be used in our bulletins and reports to a large extent. This includes also the fruit packing and fruit-storing work and the work on fruit harvesting and fruit districting. And in addition to that we have questions relating to vine culture and relating to the handling of the vine.

In relation to the seeds, trees, shrubs, and specimens, that is a clause that has been left in from the old régime, and while we do still collect and distribute specimens of fruit, most of that work is done now in connection with another office. We are spending for the general administrative work, under the first clause, which includes the rent of buildings and miscellaneous supplies and material, \$13,566. That covers all this part relating to gas and telephone service and miscellaneous expenses and all that sort of thing.

The CHAIRMAN. The next item, then, will be, "To investigate in cooperation with the other divisions and bureaus of the Department and the experiment stations of the several States the market conditions affecting the fruit and vegetable trade in the United States and foreign countries, and the methods of harvesting, packing, storing, and shipping fruits."

Mr. GALLOWAY. Yes, sir. Now we have inaugurated quite extensive work in connection with the marketing, transportation, and storage of fruit. These questions are the great questions to the fruit grower to-day, especially the marketing of the fruit after it is grown, as well as transportation and storage. The question of storage I might take up first, and briefly illustrate some of the points upon which we have been working.

It has been found in connection with the storage work that fruit grown on different soils—for instance, apples—will vary greatly when stored; and fruits taken from different parts of trees will vary greatly when stored; and fruits harvested at different periods vary greatly when stored; and these variations have a great effect on the price that the fruit brings. Here is a sample of a Baldwin apple [producing colored illustrations], with which you are all very familiar. This was taken from a clay soil, and that one was taken from a sandy soil; two quite different types of apple. When those fruits are stored for a time, they manifest quite distinct characteristics. For instance, there are troubles which develop like this so-called scald.

Mr. HENRY. Is there a difference in the keeping quality?

Mr. GALLOWAY. Yes, sir.

Mr. HENRY. Which keeps the best?

Mr. GALLOWAY. The fruit from the sandy soil, as a rule. As to the question of handling fruit, we find that the apples gathered, say on the first or the second of October, compared with the same apples gathered ten or fifteen days later, will keep a couple of months more in storage. What we are trying to do in all these investigations is to determine what changes take place and the bearing of these changes on the industry as a whole. All these questions have an important bearing on the profitableness of orchard culture, and the shipment of fruit, and the extension of our markets. We have taken up the question of the pear and of the apple, and last year for the first time we inaugurated some extensive work in the handling of citrus fruits.

The citrus growers of California ship about 30,000 carloads of oranges from that State each year, and there is about \$500,000 lost every year from rot and various troubles that are due primarily to the methods of handling and storing. The question we wanted to solve was, what were the conditions that brought about this loss in transit? Our Mr. Powell, who went to California, made some preliminary investigations, taking up the question first with the grower. He got there early enough to find the oranges on the trees, and he took it up with

the growers. The growers, according to their custom, turn the fruit over to the packing-house men, and they turn it over to the railroads. There were constant misunderstandings between these three interested parties, the growers claiming that the packing-house men did not handle the fruit properly, the packing-house men claiming that the railroads did not always properly, and so on.

In California most of the oranges are clipped with a small hand clipper. It was found that in the clipping of the fruit there are certain injuries usually at the stem end. Mr. Powell took enough of these clipper-cut injured fruits to make up about half a carload, and they were put under conditions similar to the conditions that they would be under if sent across the continent. Half of the fruit was clipper cut, and half was without injuries. From 40 to 60 per cent of the clipper-cut fruit rotted, while only 2 or 3 per cent of the uninjured fruit was lost. That gave the idea that there must be great importance in having the fruit gathered without finger-nail injuries and clipper injuries.

After shipping about 35 carloads under different conditions, all of which was donated by the growers, and transported by the railroads free, it led to this discovery, that the clipper injuries and the finger-nail injuries were responsible for the greater portion of the losses in transit. Now, after that was discovered an effort was made to change the method of clipping, and this was done. The clipper points were blunted, with the result that the losses were greatly reduced. That is one of the things we have done there. After the fruit gets in the packing house all the cleaning, sorting, etc., is done by machinery; that is, the oranges are simply carried to the packing house and machinery does nearly all the work until they get to the box, where they are wrapped.

But in the handling there are certain places where bruises might occur. That has been worked out. Now, there has been a great demand all over the Pacific coast, from the citrus growers and from the fruit growers, for a continuation of this work. And they want to see not only a practical demonstration of the handling of fruits in the orchards, but also in the packing house, and also to work out certain questions with reference to the effect of cold storage on fruit. We have been making preliminary investigations in California in precooling—that is, cooling the fruit previous to its being put in the car. We got a suggestion as to that from our work in Georgia with peaches. We have found that when we can cool a carload of fruit previous to putting it into the car it will go through from Georgia to New York without any great variation in temperature in the car.

When the fruit is gathered and put in the car direct from the orchard, the car starts out with a temperature in summer of 75 or 80 degrees and it is immediately iced, but it holds at 75 degrees for four or five hours and gradually drops to about 40, but not until it is about reaching its destination. During the period when the temperature is high in that car is when they have the greatest losses, sometimes as high as 90 per cent, from rot. With the cooperation of one of the refrigerator-car companies we cooled the fruit before—

The CHAIRMAN. Did you put it in the car cooled? Where did you cool it before putting it in the car?

Mr. GALLOWAY. In a stationary refrigerator car. We had an old car, and we cooled it in that. That went through with only 2 or 3 per cent of loss.

The CHAIRMAN. That is the same principle that they apply to beef and other meats?

Mr. GALLOWAY. Yes, sir. We undertook some work of that kind in California last year, only in a tentative way, doing the cooling by means of cold air. We had the aid of a large refrigerator plant, and they gave us the privilege of cutting a hole into their building and forcing the cold air into the car and cooling it before it started. That has demonstrated that a considerable portion of the loss in transit might be stopped by precooling. This work is only tentative as yet. As a result of the work, however, the Santa Fe Railroad has indicated already a desire, if the work is successful, to put in a precooling plant for service in southern California.

The CHAIRMAN. Have you found the railroads willing to help in these matters?

Mr. GALLOWAY. Oh, yes; in the West we have. We had some difficulty in the South. We could not get the cooperation of the railroads there that we could in the West. But in the West the Santa Fe road has been in every way accommodating. It has been an advantage to the railroads because, since these losses have dropped off, there have been less complaints on account of losses of fruit in shipment.

After finishing our preliminary work in the southern portion of the State last May we then moved up to Sacramento and made some preliminary tests with deciduous fruits, prunes, apricots, peaches, etc., and the work there has suggested that we could get practically the same results as with the orange.

Going back to the methods of storage of fruit, I may say that here are two fruits of the same variety that we picked only two weeks apart, and that is the way they came out of storage [exhibiting colored pictures]. That is the typical Northern Spy apple.

The CHAIRMAN. It lost its color.

Mr. GALLOWAY. Yes; in the immature fruit. The apple, like the other fruits, goes through a living process.

The whole question of ripening is a physiological one, and the way we gather the fruit, the way the tree is handled, and the size and age of the tree all have an important bearing on the character of the fruit and its keeping qualities. As to putting our fruits into foreign markets I may say that we have been endeavoring for many years to avoid a glut and to get our fruits abroad. Our work in this field has been quite successful. That covers, in a general way, the fruit-storage work and the fruit-marketing work. What we call the fruit district work has for its object a study of the best fruit districts of the country, with a view to getting authentic information—

The CHAIRMAN. How much money do you devote to fruit storage and transportation?

Mr. GALLOWAY. We had \$11,700 for fruit marketing, transportation, and storage. On the fruit district work we are only spending a comparatively small amount of money, \$3,400, and that work has for its object a study of conditions, ideal conditions, with a view to profiting by opening fruit industries in other regions where fruit growing has not been established. Take the Albemarle pippin. What are the conditions of climate and soil in Virginia, where the finest Albemarle pippins are grown? What are the first and the last frosts; what effect on the fruit has the soil, and what are the relations of these general conditions to the high-grade fruits that are produced in those sections?

And then the question is constantly asked, of course, by people living in other portions of Virginia and of the United States, "Why can not we grow the Albemarle pippin?" We are endeavoring by this fruit districting work to get some authentic data, and necessarily with those questions it is slow work.

Mr. SCOTT. Do you have any help in that from the Soil Bureau?

Mr. GALLOWAY. Yes, sir; we use their work.

Mr. LAMB. I have been informed by a number in my section that one farmer will produce fine fruit while another on his farm right across the road can not. Can you account for that?

Mr. GALLOWAY. We find in some of those best Albemarle pippin districts of Virginia very marked differences prevailing in adjoining farms where the soil conditions are about the same; but there are certain climatic conditions, certain air currents, that have an important bearing on fruits. One farmer will be able to produce the pippin, while another will not, simply because his fruit may be killed by early or late frosts. But it is not so much that we are studying as the general conditions, if we can discover them, which apply to the growing of these fruits in other sections.

The CHAIRMAN. The next is "To investigate, map, and report upon the commercial fruit districts of the United States, for the purpose of determining the relative adaptability of the several important fruits thereto, by a study of the conditions of soil and climate, and of the prevalence of plant diseases existing therein as related to commercial fruit production, \$60,640 (\$35,640), \$10,000 of which sum may, in the discretion of the Secretary, be expended in cooperation with the experiment station of the State of California for determining the adaptability of various grape stocks to the different soil and climatic conditions of the Pacific coast and their resistance to disease."

Mr. GALLOWAY. We have divided the vine work. We do not use the whole \$10,000. Some of that has been placed with the fruit marketing and transportation work, and a little of it goes to the general administration expenses which are involved here in our work in Washington, such as rents and things of that kind. And we have not adhered strictly to this, because we are doing considerable work in this viniculture in the Southern States.

With reference to the work in the Southern States we are endeavoring to determine certain questions having a bearing on the production of table grapes and wine grapes, and are devoting some attention to the improvement and cultivation of the scuppernon grape as a wine-producing grape. We devoted only \$200 to that. Our main work is in California.

The grape interest there probably aggregates \$50,000,000, and they have been threatened with various difficulties, the chief of which may be said to be a nonadaptability of the scion to the stock. The vineyards are dying out, and it seems to me that through changes or overproduction, or gradual conditions brought on by irrigation or fertilization, or all things combined, there must be some new blood introduced or some new system adopted. We are enlarging on the work started some years ago on the adaptations of new stocks to different conditions of soil and climate. We find one kind of stock good on one soil and another on another soil, so that we have established in California eight or nine experimental vineyards, where these questions may be tested.

We are spending about \$6,000 in that line of study. That covers the principal line of investigation we are conducting under pomological work, and the increase of \$25,000 which has been recommended in the estimates is for the fruit marketing work, the idea being to extend it to the Pacific coast and also in the eastern sections of the country, where we have started out in a tentative way.

The CHAIRMAN. Is that a sort of work on which you have to go slowly?

Mr. GALLOWAY. I think we have enough convincing data now to warrant us in saying that with this increased appropriation we can make a showing which probably in a few years will be so demonstrative that it will not be necessary to carry it further. We simply want to make a showing of what can be done by certain methods of handling and storing and shipping of the fruit.

The CHAIRMAN. I see that you leave out a little paragraph in the bill which provides "to continue investigations and experiments in the introduction and culture of European table grapes, and the study of the diseases that affect them, for the purpose of discovering remedies therefor, this work to be done in cooperation with the section of seed and plant introduction."

Mr. GALLOWAY. That is really involved in this other work, and we are cooperating—

The CHAIRMAN. You leave out the words also in the last paragraph, last line, "to foreign countries, and experiments in the shipment of fruits and vegetables." You leave out the words "to foreign countries." Was that done intentionally?

Mr. GALLOWAY. I think not, because we are trying to make experiments in shipments abroad. That might inadvertently have been left out.

The CHAIRMAN. The words "to foreign countries" are left out.

Mr. GALLOWAY. That is an error.

The CHAIRMAN. What are you doing along the line of the experiments and with the shipments of fruits to foreign countries? I thought that was closed up.

Mr. GALLOWAY. We had closed up a considerable portion of it, but there is some work to be done in connection with our fruits. Our fruits shipped from New York and Delaware, and even as far west as Illinois, have all been successfully sent abroad. The method of packing and storing in transit has been pretty well demonstrated. For instance, here are some of the illustrations which bring out the necessity of having fruit packed in small crates, and the importance of considering even the kind of paper that we use in wrapping the fruit. All that has a bearing on whether or not fruit reaches its destination in good shape and whether it will sell when it does reach its destination.

The CHAIRMAN. That work is about closed so far as northern fruit is concerned?

Mr. GALLOWAY. Yes, sir. But the work in the South has not been completed.

The CHAIRMAN. Are they shipping fruit from the southern ports—from Charleston and Mobile—now?

Mr. GALLOWAY. That has to go by rail to New York, and that involves the question of transportation by rail, and then the ocean transportation after it reaches New York.

The CHAIRMAN. There is another thing that is interesting touching the fruit industry. I received a few months ago a book from an Italian consul on "Italians in America," and I saw that the Italians were developing a great fruit industry all through the South.

Mr. GALLOWAY. They are; not only in the South, but in the West. Last year I was in California, and I visited the northern section of the State. A few years ago all this country was owned by one man; lately he has been selling the land in small holdings. A gentleman I was with took me around one afternoon and showed me some of the most successful fruit growers there. Most of these men had a little garden plot with four or five acres; orange trees growing, and some walnuts, and everything giving the appearance of thrift. I asked my friend the question: "Who are these men?" He said: "I am selling this land to Italians." Then he said: "There is a good American citizen living over there;" and he pointed out an old dilapidated place where conditions were quite different from those just described.

The CHAIRMAN. The truth of it is, the American citizen does not like that business.

Mr. GALLOWAY. No, sir; but the Italian is peculiarly fitted for it. Their little cottages were very pretty, all covered with flowers, and they were succeeding.

The CHAIRMAN. The development of the fruit industry by Italians in the South, according to the statements in this book I speak of, sent me by the Italian consul, is extraordinary. You might say that the whole fruit industry of the South is in their hands.

Mr. GALLOWAY. You may not be aware that in certain portions of the South the Japanese are coming in quite rapidly, and are making profitable advances in agriculture.

The CHAIRMAN. As I understand it, this increase of \$25,000 you are going to use altogether in your work on the transportation and marketing of fruit?

Mr. GALLOWAY. On the transportation and marketing and handling of fruits. That leads, of course, to the methods of handling in the orchard, and growing, itself, because we have got to begin with that fruit before it is taken from the tree. Our work has demonstrated that with reference to apples and also with reference to the citrus fruits.

The CHAIRMAN. How much money have you been using in the foreign part of the work, in packing and shipping fruit for foreign countries?

Mr. GALLOWAY. We have not been using a great deal; between \$3,000 and \$4,000. I have not the figures here.

The CHAIRMAN. You have not been using more than that?

Mr. GALLOWAY. No, sir; we have not had to use very much money. We have spent some money in connection with the salaries for observation on the other side. We get most of our fruit shipments free of cost, the transportation companies handling it free of cost.

The CHAIRMAN. They have cooperated with you in the way of freight?

Mr. GALLOWAY. Yes, sir.

(Thereupon, at 2 o'clock p. m., the committee adjourned until to-morrow, January 24, 1906, at 10.30 o'clock a. m.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 24, 1906.

The committee met at 10.30 o'clock a. m., Hon. J. W. Wadsworth in the chair.

STATEMENT OF B. T. GALLOWAY—Continued.

The CHAIRMAN. We will start this morning on page 16—"Botanical investigations and experiments. Investigations relating to medicinal, poisonous, fiber, and other economic plants, seeds, and weeds," etc.

Mr. GALLOWAY. Mr. Chairman, the first portion of that authority refers to "Investigations relating to medicinal, poisonous, fiber, and other economic plants, seeds, and weeds." Of the total appropriation we are devoting \$4,200 to the study of fiber plants, and the fiber plants we have been investigating are sisal, flax, hemp, to a limited extent ramie, the fiber plants of Porto Rico, and some general work on the different varieties of cotton. That work has been limited, owing to the fact that other investigations are more pressing, and we have only one man and one assistant employed in the investigation, Mr. Dewey and Miss Snyder. About one-half of the \$4,200 is spent in salaries and field expenses. The rest is devoted to the actual studies in the field.

Mr. SCOTT. Can you tell us briefly just what you have done in the matter of the ramie investigation?

Mr. GALLOWAY. The only work we are doing on ramie is, briefly, some studies in reference to the possibility of its culture in different sections. Since the Department, a number of years ago, made a study of the ramie and showed that it could not be handled by the machinery we had, the work on ramie has been practically abandoned. The ramie can be grown in a number of sections of the United States, but the problem is one connected with decortication.

Mr. SCOTT. I understood that, and that is the reason I asked the question. My information was that it had been very thoroughly shown, not only by the investigations of your Department but by the experiments of private capital, that ramie was not a commercial proposition. If that has been settled, it occurred to me it was not worth while to spend any money at all in determining where it might be grown. If there is no market for it after it is grown, it does not make any difference where it can be grown.

Mr. GALLOWAY. The fact that large quantities of ramie are used in this country—that is, brought in—has led the Department to make some minor investigations. I suppose we are not spending over two or three hundred dollars a year on the whole thing.

Mr. SCOTT. What is it imported for?

Mr. GALLOWAY. It is imported for the manufacture of cloth. That is, it can be handled by hand in China where it is grown and the decorticated fiber can be brought in and woven in this country, where it is used, and large quantities are used in England.

Mr. SCOTT. Is it woven here to any considerable extent?

Mr. GALLOWAY. Not to any considerable extent, so far as I know. There is a great deal of interest in sisal hemp and also in the hemp itself. There has been a revival of hemp culture of late years. Up to four or five years ago there was very little tendency to increase the production of hemp, owing to the fact that the hemp lands were running out, or had run out; but some recent investigations have shown that the culture may be renewed by proper handling of soil and proper rotation of crops. Some work has been done in that direction.

The work with flax has been in the same field, but with particular reference to the introduction of new types and to the improvement of types of flax that are now grown throughout the Northwest.

Mr. SCOTT. I believe you told us once that the reason flax lands wore out, as the general expression has been, was that the flax was attacked by a parasite at the root.

Mr. GALLOWAY. Yes, sir.

Mr. SCOTT. And that after a number of crops had been grown, this parasite multiplied to such an extent as to destroy the land for that crop.

Mr. GALLOWAY. They multiplied to such an extent that flax could no longer be grown on the ground.

Mr. SCOTT. Have you conducted any experiments to eradicate this pest?

Mr. GALLOWAY. Our experiments have been mainly in the direction of securing types of flax and varieties of flax which are immune. With that object in view, we had Professor Barley, of one of the Dakota experiment stations, visit the flax-producing sections of Europe, and he secured a number of varieties which were promising. He is also engaged in breeding types which are immune, and has made some advances in that direction.

Mr. SCOTT. You have nothing yet that you can recommend?

Mr. GALLOWAY. No, sir.

I might say, Mr. Chairman, in reference to the second part of this clause, the general administration of this fund, that we are spending \$17,760 in the general administrative work, which involves the salaries of eleven botanists and assistants. That includes also the rent of buildings, which amounts to \$3,000, and the purchase of necessary supplies and apparatus, telegraph and telephone expenses, amounting altogether to \$4,280, making a total, out of the \$17,760, of \$7,280.

Just in this connection I would like to call attention to a change in our organization which we have effected during the last year and which groups this work in one place, with the idea that eventually it should be carried over to the Smithsonian Institution. It is part of the old botanical investigations, which had for their object mainly the systematic study of plants; and while the Smithsonian is not now in a position to handle it, the probabilities are that when the new building is completed it may be possible or practicable to turn that whole thing over to the Museum, so they can take charge of it.

The CHAIRMAN. What portion of it?

Mr. GALLOWAY. The entire systematic work; what might be called the scientific systematic work on plants; for instance, the systematic study of grasses, the monographing of grasses in a purely scientific way; not from the agricultural standpoint, but from a purely scientific standpoint.

The CHAIRMAN. Yes.

Mr. GALLOWAY. That work has been carried on in the Department of Agriculture, but it is more in place in the Smithsonian, just as it is more in place to send out from the Smithsonian detailed scientific descriptions of insects or mammals, and when the new Museum is established and probably an organization different from the present organization is put into operation, it could possibly handle some of those features that we are now doing in our Department. With that idea in view, we have segregated from our purely utilitarian work, if I may use that expression, this what might be called ultra-scientific work, which is in certain ways a necessity, so that when the time does come that the Smithsonian people are ready to handle it it can be turned over in a body.

These gentlemen here—eight or nine botanists—have indicated that it would be satisfactory to them if that arrangement could be made, and the Secretary has had it under consideration. At the present time the Smithsonian has no funds with which to handle it, but if the Smithsonian sees fit to ask for funds to handle that proposition I think the Secretary would join in it and let them handle it. That would relieve the Department of that class of work, and either relieve the Department of that much expense or else let the money go into some other field.

That is an explanation of the first portion of the work, and covers the general systematic work of the Department. We had going on the grass and forage-plant investigations, which we will come to later.

In this connection—in the grass and forage-plant investigations—we had three or four men studying scientifically the grasses, the floras, of different parts of the country, and these men have all been taken out of the grass and forage-plant work and put over into this group. That accounts for part of the increase that we ask for—something like three or four thousand dollars—which provides for the salaries of men who have been taken care of in other groups.

In reference to the studies of medicinal and poisonous plants, we have been conducting for some time experiments and investigations with the idea of introducing certain industries in this country for which the United States is now paying considerable sums of money, especially in connection with the production of medicinal plants.

In the first place, I want to call attention to a work we have been doing in the matter of securing an American supply of morphine that is used legitimately in medicine. I do not have reference to the morphine or opium that is used in other directions. The opium of commerce, as you probably know, is secured mostly from China and is obtained by the Chinese in a way that makes the product quite expensive. The poppy flower is allowed to throw a flower bud, and then with a small knife the capsule of the flower bud is slit and the milky juice oozes out and dries, and the Chinese operator goes around a day or two afterwards and scrapes that off, and that is the opium of commerce.

Mr. SCOTT. Without any further preparation?

Mr. GALLOWAY. Without any further preparation. That is rolled in a sort of pellet or ball, and comes in the mass we know as opium. The morphine is an alkaloid. In combination with our medicinal plant investigations, one of our experiments discovered a method of securing the morphine directly from the dried capsule of the poppy

without the intervention of opium at all, and that eliminates all the cheap labor of the Chinese and makes possible the utilization of a plant which is grown in this country extensively for seed, the seed of which is used for oil. The oil of the poppy is used extensively in this country for salad purposes and other purposes. The poppy is grown extensively in California and other sections as an ornamental plant, but this opium poppy may be grown almost anywhere in the United States south of Illinois and Indiana.

It grows all through this section. We have had some plats of it out in South Carolina during the past year, a plat near Washington, and one 25-acre plat in California, and the morphine has been made from these capsules after the seed has been extracted. This material I have here shows the various processes through which the operation passes. First there is the crude morphine, and the refined morphine is indicated in there. [Exhibiting bottles.] Although the morphine is somewhat yellow, it is finally refined.

Mr. HENRY. You do this for the medicinal properties?

Mr. GALLOWAY. Yes.

Mr. HENRY. At what cost?

Mr. GALLOWAY. We can produce morphine from the poppy grown ordinarily, under commercial conditions, at a net profit of about \$40 an acre—that is, it will yield a net profit of about \$40 an acre. The cost of producing morphine by this process is 60 per cent less than the ordinary cost of making it from the opium. We can not compete with the Chinese at all by the hand process of slitting the pods and gathering this material. That is entirely out of the question.

Mr. HENRY. Does that process yield opium at any of its stages?

Mr. GALLOWAY. No, sir.

The CHAIRMAN. Can we compete with them now at all?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. In the production of morphine, but not of opium?

Mr. GALLOWAY. But not of opium.

Mr. HENRY. Has it been decided that it possesses the identical properties of morphine?

Mr. GALLOWAY. Yes, sir.

Mr. HENRY. And it is produced at much less cost?

Mr. GALLOWAY. At less cost.

In connection with some other crops, like digitalis, we import between four and five million dollars' worth of these drug plants from foreign countries, mainly from Europe, and the object of these investigations has been to open the field for the work in this country. We are growing now in a number of places digitalis and belladonna, and I have here samples of the American-grown product. [Exhibiting.]

Mr. SCOTT. Are they grown by anybody in this country commercially?

Mr. GALLOWAY. Not yet. We are entering into cooperative experiments with farmers in a number of sections to get them started on work of this kind.

The CHAIRMAN. In what portion of the United States do they grow?

Mr. GALLOWAY. These crops will grow almost anywhere in the United States.

The CHAIRMAN. Digitalis and what?

Mr. GALLOWAY. And belladonna. The stramonium or common "jimson weed" is imported in large quantities. The leaves are medicinal. It has been a question of getting these diversified things started in different directions.

Mr. SCOTT. Are these digitalis leaves from the plant called digitalis?

Mr. GALLOWAY. Yes.

Mr. SCOTT. And the same is true of belladonna?

Mr. GALLOWAY. Yes, sir. There is a great deal of interest aroused in the cultivation of camphor. The Japanese have a camphor monopoly. It is a Government monopoly, and since the Japanese-Russian war camphor is becoming more difficult to obtain.

Mr. HENRY. It is obtained from the island of Formosa, as I understand.

Mr. GALLOWAY. Largely; yes, sir. We have been making some studies of camphor production in this country. The camphor tree will grow as far south as southern North Carolina. It grows through South Carolina and grows extensively through the Southern States and into California. For the last twenty years the Department has been, in a sort of spasmodic way, sending camphor trees out all through the Southern States, so that we have them now established quite extensively. In one place in Florida there is a grove of 40 acres. Recently we had a call from one of the largest concerns manufacturing celluloid in this country, and this concern said they were using about \$500,000 worth of camphor a year in the manufacture of celluloid, and they had reached the point where it was no longer possible to secure Formosan camphor, owing to the fact that the Japanese, either through the lack of men or some other cause, were unable to protect the camphor gatherers in Formosa.

In order to make a demonstration of the availability of camphor in our own native trees, last year we had some investigations made and found, much to our interest and somewhat to our surprise, that a considerable quantity of camphor could be secured by simply distilling the trimmings from the trees themselves. The ordinary method of manufacturing camphor is to cut down the tree and distill the camphor from the wood and chips. The tests we have made indicate that camphor may be profitably secured by a distillation of the trimmings of the tree. That suggested the possibility of planting camphor in hedge rows or in hedges, like they plant the privet hedge or any other hedge, and let it stand as a permanent crop, trimming it three or four times a year and distilling camphor from the trimmings. The work that has been done indicates that camphor can be secured from the trees we already have at a profit.

In order to bring the matter in connection with the celluloid manufacture, Doctor True, who is in charge of this work, got a representative of the celluloid concern, the owner of the plantation in Florida, and himself to consider the question of making a practical demonstration of the camphor work. I have here a sample of the American camphor that was submitted to the celluloid people, and they pronounced it equally as valuable for their purposes as the Formosan camphor.

The CHAIRMAN. You say Doctor True was in charge of this work?

Mr. GALLOWAY. Dr. Rodney H. True. He is a chemist. The

result is we are now at work manufacturing some varieties for the purpose of making a practical test of the distillation of camphor from this 40-acre grove, and if that is successful, as the indications are that it will be, we will want to make some plantings on some of the cut-off lands in the Southern States, where the pines have been cut off largely for ties, with the object of establishing the camphor industry in the South.

The CHAIRMAN. How far north will the camphor plant grow?

Mr. GALLOWAY. It will grow in North Carolina, but it grows quite successfully in South Carolina.

Mr. LAMB. In the southern part of North Carolina?

Mr. GALLOWAY. Yes, sir. It also grows in Texas.

The CHAIRMAN. In low altitudes?

Mr. GALLOWAY. In low altitudes. It is a quick-growing tree.

Mr. LEVER. In what kind of soil does it grow?

Mr. GALLOWAY. It will grow on sandy soil, but in richer soil it makes a richer growth. We have quite extensive plantings in South Carolina, at Summerville, and in Texas we are planning to put up camphor wind-breaks in the tea farm there, so as to use not only the tea, but the camphor as well; but this idea of utilizing the camphor from hedges will make it practicable to bring on the crop very much quicker than where we wait for trees.

A part of the increase asked for in the botanical investigation is to extend this work on camphor and some of these medicinal plants. About \$8,000 has been asked for, not only for the camphor, but for the medicinal plants, the poisonous plants, which I will refer to later, and some other crops relating thereto.

Mr. SCOTT. Just what do you mean by capsules in connection with the production of morphine?

Mr. GALLOWAY. The poppy when it prepares to bloom makes a sort of burr capsule, something like the old jimson-weed burr, only smaller. You are familiar with that, I presume.

Mr. SCOTT. Yes.

Mr. GALLOWAY. Before the flower opens up that is quite a prominent thing, about the size of a good-sized hickory nut. That is what the Chinese slit, and a milky juice oozes out like a milkweed.

Mr. SCOTT. It is practically the bud of the flower, is it not?

Mr. GALLOWAY. It is the bud of the flower; yes. That capsule persists—that is, after the flower opens up seed are formed inside of that capsule, and the seed can be taken out and used for oil or for any other purpose. Then the capsule can be ground up and morphine extracted. It is practically a waste product that we use. It was heretofore considered of no value.

Mr. SCOTT. You can let it mature after the seeds have been taken out and still use it?

Mr. GALLOWAY. Yes; cut it right out.

Mr. HENRY. You get a cheaper product.

Mr. GALLOWAY. We get a cheaper product. This [indicating] was obtained from the California 25 acres we have.

Mr. SCOTT. I understand this 25 acres belongs to a private owner.

Mr. GALLOWAY. Yes, sir; all of the plantations we have put out were put out in cooperation with private owners. We are furnishing the seed and paying a portion of the expense of cultivation, and where the morphine was extracted the value of the product was to go to the

cooperator. We wanted to make that sort of demonstration not only to demonstrate the feasibility of growing the poppy, but the feasibility of very cheaply extracting the morphine. The apparatus required is comparatively inexpensive.

Mr. LEVER. Has this proven profitable in a commercial way?

Mr. GALLOWAY. It has proven profitable in a commercial way where the poppy is grown for the seed and for the oil in California. The demonstration has not been fully carried out yet in the eastern portions of the United States, but the gentleman who planted this 25 acres in California last year will put in a much larger planting this year.

Mr. LEVER. How will the products from this experiment you are making compare with the ordinary crops raised out there?

Mr. GALLOWAY. It compares very favorably. That is, in this particular case the net profit is about \$40 per acre. That is a clear gain to the California man, because heretofore he has simply been discarding thrashed-out capsules.

Mr. SCOTT. You say this man in California will plant an additional amount of land this year?

Mr. GALLOWAY. Yes.

Mr. SCOTT. Will you continue to cooperate with him?

Mr. GALLOWAY. Yes, sir. If possible we want to do enough work to show to him that he can, if he so desires, put in the necessary apparatus to extract at least the unrefined morphine, so that he could turn it over to a refining chemist, like Powers and Weightman, and those men would buy it at a fair price. It will be something like the unrefined sugar. The material can be turned over to the refining agents, who will pay for it as a crude product.

Mr. SCOTT. Does not the fact that he is going to increase his plantation show that he is already convinced?

Mr. GALLOWAY. In this case he knows he can at least make his money out of it from the seed and from the oil; but this man has pretty nearly 7,000 acres in seed crops alone, so that a 100-acre poppy plantation is a small thing to him. He plants 6,000 acres for seed, among other things. Of course he sells a great many seed to the Department. He is among the bidders who bid on seed, and in that way he got interested in this other proposition.

Mr. SCOTT. Of course he could sell a great many seed to the Department if the Department paid for the expense of his plantation. What I was asking my questions for was to learn whether or not the Government was getting anything for the investment it was making in his work.

Mr. GALLOWAY. The Government is getting the experience and the knowledge that is necessary and the facts that are necessary to enable other people to go into the business if they want to go into the business. In all such work we have contracts which prevent the man who is cooperating with us from getting any information that we can not give out to anybody else, and his contract calls for the growing of the plant, the furnishing of all labor, according to my recollection, and we furnish him the seed. In this case we extracted the crude material for him.

Mr. LEVER. Doctor, in that connection have your demonstrations induced other farmers and neighbors to take up this work on their initiative?

Mr. GALLOWAY. No; we have not gotten that far. That is what we are working for now. We had one or two farmers in this section last year undertake it, and we had one or two farmers who would have nothing to do with it.

Aside from the medicinal plants—that is, plants that are not strictly medicinal plants, but ornamental plants—we are doing a great deal of work in such things as paprika pepper—a sweet pepper—large quantities of which are imported. This year we have had a 20-acre plantation in South Carolina, where we are growing not only these peppers, but a number of other plants of this nature. We took up the work there because the tobacco industry in that section is at a low ebb. Tobacco is selling at about 6 cents a pound. The conditions are all very favorable for this sort of work. The barns are standing idle, and barns are necessary in the growing of these products. The work last year was very successful. I have samples here of the various peppers and other things that have been grown.

The CHAIRMAN. Will these grow here in Washington?

Mr. GALLOWAY. Every one is grown on the plat here in Washington. We can grow the paprika here in Washington.

The CHAIRMAN. How do you use the peppers?

Mr. GALLOWAY. That pepper [indicating], which is similar to the Japanese pepper, is used either in pickles or in powdered form, like this sample over here.

The CHAIRMAN. Do you use it as a pepper?

Mr. GALLOWAY. Yes. That one [indicating] is used largely in the manufacture of chili sauce, hot tamales, and things of that kind. It is exceedingly hot.

Mr. DAVIS. Are we growing any of that chili pepper, or do we import most of it from Mexico?

Mr. GALLOWAY. Most of it is imported from Mexico. There is considerable grown in Texas, however.

Mr. SCOTT. That is not the Mexican pepper.

Mr. GALLOWAY. Not that one.

Mr. BROOKS. The Mexican chili is much larger than this, is it not?

Mr. GALLOWAY. Yes, sir. There are various plants we call chili.

Mr. LEVER. How much of that stuff is there imported?

Mr. GALLOWAY. I should say two or three hundred thousand dollars' worth.

Mr. LEVER. And we can grow all of it here?

Mr. GALLOWAY. Yes, sir.

The things we are working on are poppy, camphor, licorice, hops, cassava, belladonna, golden seal, paprika peppers, pennyroyal, lobelia, and pinkroot. The hop question is an interesting one, and we have asked two or three thousand dollars of the eight or nine thousand dollars included in this estimate to undertake some work in hops?

Hop culture, in California especially, is in a state where, if it is given some little attention, we believe we can compete with some of the best European hops. A bale of hops sells for about the same price as a bale of cotton, about \$50, and we can grow enough hops to practically meet the requirements of Europe, but the quality of our hops is not equal to the best Bavarian and other hops. The question is largely one of handling and fermentation—not of growing, but handling after the crops are grown. Hops are handled and cured very much

like tobacco or tea is handled or cured. It must go through certain processes with which we are not yet fully familiar.

The CHAIRMAN. Is it a question of labor at all, Doctor, or a question of familiarity?

Mr. GALLOWAY. It is a question of unfamiliarity with the proper methods of handling. Heretofore our American growers of hops have been largely interested in producing quantity. Now we have reached a point where it is desirable and necessary to produce not only quantity but quality. The quality of hops is a question that is attracting a great deal of attention, especially from the manufacturers of beer, and the buyers of hops are so proficient in their knowledge as to just what is necessary to make a good beer that they take these small quantities of hops, and by looking at them and by the smell of them they can tell whether to pay a certain price, or whether it is low or high. Our best beers are made from the imported hops. The California hop industry has extended rapidly in the last five or six years. There is one concern in California now, I think, that grows over a million pounds of hops.

Mr. HENRY. Doctor, I would suppose that certain valleys near the Puget Sound would grow a very fine quality of hops.

Mr. GALLOWAY. They do grow a fine quality.

Mr. HENRY. But not as good as the imported?

Mr. GALLOWAY. Not as good as the imported. Some of the Bavarian hops we have not been able to equal in the American product.

Mr. HENRY. You think the difference is in the process of curing?

Mr. GALLOWAY. The hop growers all agree that the difference is not so much in the growing of hops as in the handling and curing. Of course, the soil and general climatic conditions have something to do with it. Some of the California hops, especially those grown in the upper part of the Sacramento Valley, are making a high record for quality.

Mr. SCOTT. A higher record than the northwestern hops—the Washington hops?

Mr. GALLOWAY. No, not any higher; but fully as high. Probably a half a million dollars has been spent by these men in machinery devised for the purpose of curing hops on a large scale. The best European hops are all handled in small quantities and almost wholly by hand. These gentlemen are hoping that some method can be discovered whereby we can still hold to our accepted methods of production and handling, but raise the standard of quality. Those are the questions we are working on.

In the poisonous-plant investigations our studies have been mainly in connection with loco poisoning in the West and larkspur poisoning and big head in sheep. We think we have at last accomplished something definite in the matter of the loco poisoning. As you know, the loco question has been a mixed question for a great many years in the western country. This last year we have obtained definite results which indicate the presence of a specific alkaloid or poison in two species of the loco plants. These poisons when injected into rabbits will produce death in a length of time depending altogether on the quantity we used, but we have evidence also that the same material that we have found, when taken by horses, will act in the slow, cumulative way that we know as loco poisoning—first, a falling off in flesh, then

nervousness, and, finally, staggering and general indications of lack of mental ability to correlate their physical wants with their mental wants. That is a sort of slow poisoning effect that results in death always in anywhere from two months to six months.

Mr. SCOTT. It results in a species of insanity, does it not?

Mr. GALLOWAY. Yes, sir. All sorts of theories have been advanced in reference to the cause of loco poisoning. It has been generally known that certain plants out there produce what they call loco—that is, these loco plants.

Mr. DAVIS. Doctor, that is the generally accepted opinion, and I did not know there was any doubt about it.

Mr. GALLOWAY. Questions have arisen as to certain animal parasites producing it. Scientists have never known whether it was due to internal parasites, animal parasites, or whether it was really due to the eating of these loco plants.

Mr. DAVIS. The loco plant comes up very early in the spring, before any of the other weeds.

Mr. GALLOWAY. Yes.

The CHAIRMAN. That is when there is the greatest danger from it.

Mr. GALLOWAY. Yes. A great many feeders have claimed that they have fed loco continuously to their animals and have never had any harmful results. On the other hand, there are others who insist that it is the eating of these plants that produces the result.

Mr. FIELD. What is the Department directing its attention to?

Mr. GALLOWAY. They first want to ascertain if the plants in question, which are commonly believed to be the plants, are the ones that produce the effects and, if so, in what way they produce the effects. Do they produce the effects through the action of certain poisons present in the plant, or is it due to a disarrangement of the digestive organs, brought on, not by the presence of any poison, but by the fact that animals are necessarily, at certain seasons of the year, forced to eat large quantities of certain plants? But the indications all point to the fact that the loco plant contains a virulent, active poison, which, when administered in large doses, will produce death, and quickly, and when administered in small doses will produce the cumulative effects known as loco poisoning.

Mr. FIELD. Suppose you establish that as a fact, then what will follow?

Mr. GALLOWAY. If that is established as a fact, then the next step is to work for an antidote, some way of neutralizing the effects of this poison. That will be the next step, and that is the work we are engaged on now, partly in cooperation with the Colorado Experiment Station, where they are furnishing animals and we are furnishing the expert assistance and securing the plants, and where we are carrying on feeding experiments and doing the general work necessary to make this demonstration improve our results.

The CHAIRMAN. Doctor, do you understand that the animal gets what might be called the loco habit, and after he gets at it he is continually looking for this weed?

Mr. GALLOWAY. Yes; the evidence now seems to point in that direction; that there is a sort of craving for the thing after the animal once gets started.

The CHAIRMAN. There is no doubt about that.

Mr. GALLOWAY. The animal will wander around and overlook good feed and select this weed. It is like the morphine eater.

Mr. SCOTT. Do you mean to say that he identifies the weed?

The CHAIRMAN. Yes; he identifies it just as he identifies alfalfa.

Mr. BROOKS. It is like tobacco in the human system. They get the habit and wander for miles and then gorge themselves on this weed.

Mr. GALLOWAY. Those western animals develop many idiosyncracies that animals in the East never develop. For example, although I have never seen it myself, I have pictures that some of our men have shown me where a horse will go miles and miles, and finally he will get to a place and will paw after water and keep pawing until he gets water. They have developed that habit. An eastern horse would never know what to do under such circumstances.

Mr. BROOKS. You have only been doing this work along this line this present year?

Mr. GALLOWAY. This last year.

Mr. BROOKS. And it has been rather extraordinarily successful, has it not?

Mr. GALLOWAY. Yes, sir.

Mr. BROOKS. Hitherto there has been growing up a general idea in many sections that it was all a fake.

Mr. GALLOWAY. Yes; we had that idea ourselves.

Mr. BROOKS. A good many stock papers questioned whether it was a poison at all. They thought it was a vagary of the stockmen themselves—that they had loco instead of the cattle.

Mr. GALLOWAY. Yes.

The CHAIRMAN. When a bullock gets the habit, you will see him wandering around hunting for this thing. You see him so many times you may imagine it is five or six or a hundred different bullocks, but it is the same animal.

Mr. BROOKS. In Wyoming they have whole ranges covered with this weed in the spring, so that when you look over the country it looks like a flower bed.

Mr. GALLOWAY. Last year it was exceedingly abundant on account of the good rainfall in that region.

The CHAIRMAN. The animals did not eat it so much last spring because the grasses were so good.

Mr. GALLOWAY. We did not have so many reports of loco poisoning last year. It is usually more pronounced in times of stress.

The CHAIRMAN. And yet there was as much or more loco over the ranges.

Mr. GALLOWAY. Two years ago we thought we had the loco proposition with reference to sheep pretty firmly fixed; but these investigations have led us to believe that there might be some error. In that case we found in all the locoed animals evidence of internal parasitic worms, and when we got that far we turned the matter over to the Bureau of Animal Industry, but we fed sheep on loco and never secured any specific results. Our experts always found the presence of this little parasitic worm in the intestines, and it led us to believe that possibly the worm might be the cause of the loco rather than an alkaloid that they might secure from eating the plants.

There is a disease of sheep in the West that is known as big head, which is very destructive.

Mr. BROOKS. Are you through with loco, Doctor?

Mr. GALLOWAY. Yes.

Mr. BROOKS. I want to ask you a question or two about that. What are your plans for carrying on this work?

Mr. GALLOWAY. Our plans are to continue the demonstration work, but to use more animals. We have been restricted, from lack of funds, in getting more animals. We can buy the animals out there very cheaply, of course. We have also been somewhat restricted in our work from the fact that we have not been able to get enough assistants.

The CHAIRMAN. Are you cooperating with the experiment station?

Mr. GALLOWAY. We are cooperating with the experiment station.

The CHAIRMAN. Would the experiments be carried on in the experiment stations?

Mr. GALLOWAY. No, sir; we found we could not very well carry them on right at the station, because the conditions were not proper. We have to carry them on where we can get an abundance of the plants, and get them at certain stages at all times; but a good deal of the work has been done right at the station.

The CHAIRMAN. Is there any section of the country where you can get an abundance of the plants?

Mr. GALLOWAY. No; not harvested, as we would forage crops; but it has to be gathered in a sort of general way. The handling of the animals and the care of them, on the advice of the station people themselves, has been conducted at one or two places other than at the station.

Mr. BROOKS. The stations have furnished the cattle?

Mr. GALLOWAY. The stations have furnished the cattle.

Mr. BROOKS. You did not have more than 25 cattle to experiment on last year?

Mr. GALLOWAY. No.

Mr. BROOKS. In your judgment is that adequate to get at the result?

Mr. GALLOWAY. No; we prefer to have more. We prefer to enlarge the scope of our investigations. We expect perhaps to spend \$2,500 in that work in addition to what we had last year.

Mr. BROOKS. Would it increase the effectiveness of the work to have more men or not?

Mr. GALLOWAY. It would in some directions; yes. We have difficulty in making autopsies because we have not enough men.

Mr. BROOKS. As I understand, it is quite an important thing to get the work of the autopsy pretty fresh.

Mr. GALLOWAY. Pretty fresh.

Mr. BROOKS. Would there be any impropriety—I think that can be done—in securing donations of locoed stock?

Mr. GALLOWAY. Of locoed stock?

Mr. BROOKS. Yes; or of stock for the experiments.

Mr. GALLOWAY. There would not be much advantage to us in having stock already locoed, for we are already pretty familiar with the symptoms of locoed stock. We need stock that is not locoed.

Mr. BROOKS. I have talked with some of the men there, and I want to ask this question. I think there are some of the stockmen who would be willing to give a small number of cattle to the station. In fact, they have told me so.

Mr. GALLOWAY. Nonlocoed animals?

Mr. BROOKS. Yes.

Mr. FIELD. Have these experiments been extended to cattle as well as horses?

Mr. GALLOWAY. Yes, sir.

Mr. FIELD. It is mostly in locations where the weed is found, is it not?

Mr. GALLOWAY. Most of our experiments have been conducted in the regions where the weed is found.

Mr. FIELD. The agricultural college in our State is 500 miles from the loco.

Mr. GALLOWAY. But in Colorado these plants grow close to the station.

Mr. SCOTT. Did you say sheep are immune to the poison?

Mr. GALLOWAY. No; they are locoed, but this last year we concentrated our efforts entirely on horses and cattle.

The CHAIRMAN. I do not think there is much loco among sheep, from what I hear. It is practically confined to cattle and horses.

Mr. BROOKS. I think that is true. Have you any figures or estimates at all as to the seriousness of the loco problem?

Mr. GALLOWAY. We had some general estimates. I haven't them at my command now, but we made some general estimates two or three years ago. They are only general, from the fact that there is no systematic way of getting the statistics. We simply have to assume our ground from the general statements that cattlemen and horsemen make.

Mr. BROOKS. It is a rather serious thing, is it not?

Mr. GALLOWAY. A rather serious thing.

The CHAIRMAN. It is about like lockjaw. I think it is not a very serious thing, but it is well worth looking after and trying to prevent.

Mr. BROOKS. It is like the scab and mange, in that it is much more serious with a herd not well kept up than it is with a herd which is well kept up.

Mr. GALLOWAY. Yes; any herd that is well cared for and well handled does not have as much trouble with it as the herds which are not so well kept up.

The CHAIRMAN. According to that theory, it would affect the herds in the north, where they were starving pretty nearly all winter, rather than the herds in the south. I did not know there was much loco in the north.

Mr. GALLOWAY. Yes; there is considerable loco up through Montana.

The CHAIRMAN. How far north of the Colorado line do you find it?

Mr. GALLOWAY. We find it in Montana.

The CHAIRMAN. I never heard much complaint of it in Montana or Wyoming. I thought the bulk of it was south of what you might call the northern line of Colorado.

Mr. GALLOWAY. We worked in Colorado because they have pretty good facilities at the station.

Mr. BROOKS. There is a loco area around Flagstaff, is there not, Doctor?

Mr. GALLOWAY. Yes, sir.

Mr. BROOKS. As I understand it, the centers are in northern Arizona, Wyoming, southern Montana, western Nebraska, and eastern Colorado.

The CHAIRMAN. I am right, I think, when I say I do not believe it is very injurious north of your northern line. It tapers off as you go north, because you have very little of it north of that line. The worst of it, as you say, is down in Arizona and that country.

Mr. BROOKS. Your estimates here include this increased work, do they?

Mr. GALLOWAY. Yes, sir. They include the work on the poisonous plants, medicinal plants, the work on hops, camphor, and the lifting over of about three or four thousand dollars of salaries now paid in the grass and forage-plant investigation for the systematic investigators.

Mr. SCOTT. Doctor, could you at this place, as well as any other, give us a detailed statement of the directions in which you expect to apply this increase?

Mr. GALLOWAY. Yes.

Mr. SCOTT. Stating how much for each one?

Mr. GALLOWAY. Yes; I have it here. The total is \$16,700. Eight thousand dollars of this is for the extension of work in the investigation of poisonous and medicinal plants. That is all summarized in the little note right there.

Mr. SCOTT. Then it is not necessary to put it in the record. I simply wanted it for guidance in the future.

Mr. GALLOWAY. It is under three heads there.

Mr. SCOTT. Yes; I see. At this point I would like to ask how much money you are now spending on what you call your ultra-scientific systematic work?

Mr. GALLOWAY. We are spending for the salaries of the botanists \$10,480. We are spending for the miscellaneous expenses, which should not all be chargeable to this work, for the reason that it of course covers rents and a lot of other matters—

Mr. SCOTT. The salaries should all be charged?

Mr. GALLOWAY. Yes; \$10,480. We have charged to this same thing all the rent and all the miscellaneous expenses connected with the building, which houses a dozen other groups of work, amounting to \$7,280, making a total of \$17,760. Splitting that, I might say that \$14,000 would probably represent about the sum.

Mr. SCOTT. I am very much impressed by the remark you made that this purely scientific work could well be turned over to the Smithsonian Institution or some other scientific institution; that the work of the Department of Agriculture ought to be such as relates wholly to the improvement of our agricultural interests.

The CHAIRMAN. That is not quite as I understood the Doctor, that purely scientific work should be turned over.

Mr. GALLOWAY. It is scientific work, but it is a certain kind of scientific work. What I had in mind was this: When I first came into the Department our work predominated in that direction. For instance, when a bulletin was issued on the grasses of the South or the grasses of the North or the grasses of the West or the grasses of the Northwest, it meant that it was a bulletin containing scientific descriptions of the grasses found in those particular regions, without reference to their agricultural uses, or anything of that kind.

Mr. SCOTT. Bulletins which would be of no use to a farmer?

Mr. GALLOWAY. No; but would be of good use to the botanist in the experiment stations, in the universities, and elsewhere, and would form a good basis for the studies along purely utilitarian lines. The same is true of the forestry work. In the old days the Forestry Bureau would publish a list of trees in the Southwest, for instance, and descriptions thereof, and so on. That was about all forestry consisted of, and to encourage tree planting. That has all been changed in the last fifteen or eighteen years, and our work has been carried, as you gentlemen are well aware, right into the field. Now a man's predominant idea, when he comes into the Department, especially when he comes into the Bureau of Plant Industry, where our work must be made practical, is that of course he is to have these practical results based on scientific research, but at the same time he has always in mind that some time and somewhere he is going to apply that in a dollars-and-cents way. That is what we try to impress on a man.

Mr. BROOKS. You would not advocate segregating the scientific basis?

Mr. GALLOWAY. Not at all. You take this work on loco. The basis of that work is chemical investigations as to the nature of the alkaloid—the effects of the alkaloid on the animal itself. All the work which Mr. Woods has described here in our pathological investigations has for its basis scientific work, but we do not want a man when he starts on that scientific work to put on a big pair of spectacles, and never see beyond the laboratory door or beyond the spectacles.

Mr. SCOTT. I did not understand you to mean that it was your idea to abandon purely scientific work.

Mr. GALLOWAY. I did not say that.

Mr. SCOTT. I recognize perfectly well that all the work the Department is doing is based on scientific investigations. The only purpose of my suggestion was to have work which has no other end than science put into a bureau or into some institution which gives its entire attention to science.

Mr. GALLOWAY. Some of these lines of investigation might very profitably be carried on for years and years with no ultimate utilitarian idea in view in a scientific way, but should be carried on either by the Carnegie Institute or the Smithsonian, or some office of that kind. But what I was endeavoring to bring out was the fact that we have been segregating that kind of work, putting it together, so that it would not be scattered through all our different lines of investigation, and have it all in one place. In this next office we discuss I will call attention to that in connection with our grass and forest-plant investigations.

The CHAIRMAN. Doctor, along the line of this grain grading, what was the cause of the Department embarking in that business? Has not that been done by the several boards of trade all through the country?

Mr. GALLOWAY. In the last five or six years there has been a great deal of attention given to the question of grain grading, chiefly from the fact that much complaint has been made by the foreign buyers of grain on the ground that our grain is not properly graded and inspected, especially at our export points; and it has come to the point where our foreign grain export work is really suffering, owing to the

fact that nearly every one of these export points has a different system of grain inspection. In addition to that there has been a great deal of complaint from the great grain-growing sections of the West and Northwest, from the growers of grains themselves, on the ground that they sell their grain at one grade and it all goes into an elevator at one grade and comes out at another grade. In other words, it is not a square deal on the grading question, so far as it appertains to the grower of grain, and that has led to the introduction of several bills in the Senate having for their object the turning over entirely of all the grain grading and inspecting to the Government.

We have had that matter under consideration for some time, and we find that to carry out that plan would cost the Government in the neighborhood of about \$800,000 to establish the inspectors and necessary officers to take over this great mass of inspectors who are now in existence. Our belief is, on this thing, that we must necessarily go slow, and if inspection is to be done at all, and paid for, it ought to be paid for by the men who sell the grain. It could be done in that way; but what we want to do is to establish a basis for grain inspection. We do not even know what that basis is as yet. We want to establish a mechanical basis for proper handling of grain.

I can illustrate this point probably better by saying that the whole grain question is in about the same condition that the milk question was in before the Babcock test was discovered. Those who understand that know perfectly well what the Babcock test has done for the standardizing of milk. We want to work out a system for standardizing grain. We believe it can be done, and we have already made some advances in that line. One of the important things is to standardize the moisture content of grain.

The common method is for an inspector to go to a car of grain and put his hand in and say: "There is so much moisture in it." We want a mechanical method of determining accurately. It can be done for grain, but we want to be able to do it quickly. We have one or two of our men working on that now. By a method which we developed last year we can determine the moisture content in about three or four minutes. We want to reduce it, if possible, to a minute or half a minute, so that we can determine the moisture content of grain in half a minute. It may be finally done electrically, as the moisture content of soil has been worked out by our physicist, Doctor Briggs. The standardizing of the color is a simple matter. The standardizing of the amount of impurities present is comparatively simple, and when we can work those questions out it will be possible—I say possible and very probable—to establish a uniform system of grading, but those things will have to be worked out in laboratories carefully and conservatively, and by men who are familiar with the general questions.

Our work has been along that line. In addition we have been making some observations and getting facts on the cargoes of grain that go abroad. We have made investigations of grain shipped from different points and the condition in which that grain reaches its destination. Work has been especially done on corn. In the spring great complaint has come from foreign buyers of corn that corn from one port has reached its destination in almost a rotten condition and from another port it has reached its destination in very good shape. Those questions can be met probably by some simple

system of quickly drying grain before its shipment, at a cost of probably not more than 1 cent a bushel.

The CHAIRMAN. That is done now.

Mr. GALLOWAY. That is done now to a certain extent, but it is not done very much with corn.

The CHAIRMAN. Corn is a rather dangerous thing to ship on account of moisture; probably more so than others.

Mr. GALLOWAY. Yes. We had samples of corn sent us last year from Rotterdam that had reached its destination practically fermented to the point that it smelled of alcohol.

The CHAIRMAN. That was simply loaded in bulk when it was too wet. How do you propose to stop a case like that?

Mr. GALLOWAY. That corn ought not to have been allowed to be shipped, if the moisture content had been accurately determined.

The CHAIRMAN. But the Government can not stop that.

Mr. GALLOWAY. We can not stop it now.

The CHAIRMAN. You could not stop it anyway, could you? If a man wants to ship his corn wet, who is going to stop him?

Mr. GALLOWAY. We could in export trade.

Mr. SCOTT. A man does not want to do it if he knows it.

The CHAIRMAN. Here is the case of a man who has done it.

Mr. GALLOWAY. We could not stop it now.

The CHAIRMAN. How could you stop it at all? Suppose I wanted to ship a carload of corn that was wet. If it was my own corn nobody could stop me.

Mr. SCOTT. The Government could tell you that if you do it it will be rotten when it gets to its destination.

Mr. GALLOWAY. I am not advocating that the Government should adopt any measures that would prohibit that sort of thing, but I am arguing simply that we ought, in an educational way, to show the shipper that such a thing is a very unwise thing to do for his own reputation and for the reputation of the country.

The CHAIRMAN. I should think his own pocket would tell him that.

Mr. GALLOWAY. It does not always do it. As things stand now, he does not have the knowledge that his corn is too wet. He turns it over to an inspector and the inspector passes it.

The CHAIRMAN. How long have we been exporting corn and wheat in this country?

Mr. GALLOWAY. We have been exporting wheat for fifty years or more.

The CHAIRMAN. Do you not think fifty years' experience ought to have taught them?

Mr. GALLOWAY. It has not.

The CHAIRMAN. If fifty years' practical experience has not taught them, any teaching the Government could give them would not amount to much.

Mr. GALLOWAY. It is not that so much, but the fact that grains are shipped abroad on certificates and the grains do not live up to the certificate.

The CHAIRMAN. That is a matter between the shipper and the purchaser on the other side, is it not? He contracts for a certain grade of grain, and if he does not get it, it is a matter of adjustment between the two.

Mr. GALLOWAY. That is a matter of arrangement between the inspection service at the port of shipment and the buyer at the other end, as you say.

The CHAIRMAN. If the grain does not fill the contract, the price is readjusted.

Mr. GALLOWAY. It is not always readjusted. Sometimes it is absolutely refused. A recent communication from Consul Skinner, of France, states that a cargo of nearly 8,000,000 bushels of wheat was refused on the ground that when the samples were received they did not come up to the certificates. There was considerable wrangling before that was finally adjusted.

The CHAIRMAN. That is a matter of adjustment. Those things occur in all interchanges and all commercial transactions. If a cargo of lumber is handled and the shipper does not fulfill his contract, it is a matter of adjustment of price when the other man receives it.

Mr. GALLOWAY. At the same time the lack of uniformity in the grading of grain and the inspection of grain is steadily leading toward the injury of our market for grain and to the benefit of markets to the south of us.

Mr. SCOTT. Are the people to the south of us who compete with us in European markets any better skilled in the grading of the grain than we are?

Mr. GALLOWAY. In some respects they are better skilled, and they do not have such a great number of shipping ports. Take the Argentine, for example. There they have climatic conditions in their favor.

The CHAIRMAN. You have hit the keynote. It is climatic conditions that are more favorable. I do not think they are any more expert than we are.

Mr. FIELD. The information sought to be obtained by the Government is such that it will be able to inform the shipper that a certain amount of moisture would result in damage or ruin, perhaps, to his grain. Everybody knows that wet corn will spoil, but he does not know what certain amount of moisture would be injurious, because moisture may dry out, as if often does.

Mr. GALLOWAY. Yes; there is a certain standard that could be fixed for corn as to the amount of moisture. We do not hold it is our business to enforce that standard, but we do hold it is our duty to attempt to determine that standard, and then to follow up the question and see in what way that standard will hold up from the purchaser's hands to the consumer.

Mr. DAVIS. An experienced man might be mistaken unless the Government had established a standard of moisture?

Mr. GALLOWAY. That is just where the difficulty now comes in. It all depends on the idiosyncrasy of the man. If a man has a pretty good breakfast he might, under present practice, go out and stick his hand into a cargo of corn and say, "Let her go."

The CHAIRMAN. Would not the Government expert be about the same? Would he not be human, too, if he had a good breakfast?

Mr. GALLOWAY. Not if he brings a sample of the grain into a place and has the proper contrivance to test it.

The CHAIRMAN. Has not also the question of absorption of moisture a good deal to do with it?

Mr. GALLOWAY. Absorption in transit, you mean?

The CHAIRMAN. Yes.

Mr. GALLOWAY. We find in different parts of the country different results in that respect. For instance, the corn that goes out from New Orleans, coming down the Mississippi Valley in the spring, is not always reported back in good condition. The corn that comes from farther East and goes out through Newport News and New York and Baltimore is reported as being in much better condition.

The CHAIRMAN. That is the result of climatic conditions. It goes out of a warmer climate and comes into a cooler climate.

Mr. GALLOWAY. If the port of New Orleans wishes to keep up its reputation in inspection work, the reputation for exporting good grain, it should at least adopt some definite standard and not allow all sorts of things to go out of its port. Of course that is for its own good.

The CHAIRMAN. They ought to do that locally.

Mr. SCOTT. Mr. Chairman, I think this work is extremely important. We have a great deal of complaint out in Kansas about the variations of grading at Kansas City, and the same complaint comes from every center where large quantities of grain are shipped. We spend \$800,000 a year to protect the foreign markets of our shippers of live stock, and I think we might well spend enough to at least advise our people as to proper standards in the matter of grain.

The CHAIRMAN. I would like to know how far you would go with that. Would you apply that to lumber going abroad? Would you standardize lumber? We ship a good deal of it.

Mr. LAMB. Lumber is subject to inspection everywhere.

The CHAIRMAN. Would you have established a Government standard of that also? How far would you go into this question? If you enter into the corn and wheat business, you can go into a good many others.

Mr. LEVER. And cotton also.

The CHAIRMAN. You could go into cotton and lumber and everything we export.

Mr. BROOKS. You are discussing this question not from the view of the individual shipper, but of the market?

Mr. GALLOWAY. Yes; in a broad way. I am not holding to the argument that the Government must inspect these things.

Mr. DAVIS. Doctor, is not the object of this grain inspection, according to your theory, for the purpose of placing it within the power of shippers to do it if they see fit?

Mr. GALLOWAY. Yes.

Mr. FIELD. And making the grading uniform?

Mr. GALLOWAY. Making the grading uniform.

Mr. DAVIS. It is a good deal like the standard of weights and measures.

Mr. GALLOWAY. As it is now, every man is for himself.

The CHAIRMAN. Doctor, have not the boards of trade fixed these standards, and have they not practically adopted a uniform standard?

Mr. GALLOWAY. No, sir.

The CHAIRMAN. I think they certainly must have, because grain graded in Chicago is sold in New York or Buffalo or anywhere along the line where it comes through in carload lots.

Mr. GALLOWAY. Yes; complaints come not only from our export points, but they come in large numbers from the producers of grain

in the great grain sections themselves, who do not think they are being treated fairly on the question of grading. They are at the mercy of these inspectors and graders. They have no redress.

The CHAIRMAN. I think that is an exaggeration. We do not hear much of that. Our grain is sold locally all through the United States to the local elevator man at the depot. He takes a handful of it and says: "How much will you take for it?" As a rule, the farmer is given a pretty good price for that grain.

Mr. DAVIS. And the elevator man usually makes sufficient deduction to warrant his coming within any possible grade.

The CHAIRMAN. That is his business.

Mr. DAVIS. In other words, he makes a great deduction so as to be sure that when he strikes another market he will be within the limit, and the result is, the farmer usually gets the worst of it.

The CHAIRMAN. I have never found the American farmer a "babe in swaddling clothes." When you want to buy anything from him, he is pretty capable of taking care of himself in my country, and I imagine it is so all over the United States.

Mr. DAVIS. The farmer is bound to prosper in spite of bad regulations, but he would prosper a little more if he had more just regulations.

Mr. GALLOWAY. The records that come to the Department from the northwest country, especially from the Dakotas, Wisconsin, Minnesota, and the States where large quantities of grain are produced, are that they do not believe they are always treated fairly when they turn their grain over to these men. They see great quantities of grain that they are paid for on the basis of a certain inspection at a certain standard go into an elevator and come right out, the same thing, with a higher grading, and the difference in price that is fixed goes into the middleman's pocket. I do not think that is fair treatment.

Mr. DAVIS. Mr. Chairman, you ought to go up to Minneapolis and stay a while. I think you would soon be familiar with it.

The CHAIRMAN. They are buying their wheat just as cheaply as they can.

Mr. DAVIS. There is quite a margin between the high No. 2 and the low No. 1. They buy it all as No. 2, and there is a certain limitation in No. 1 between the high and the low. It is all bought as No. 1 or No. 2. It is then put into the terminal elevators, and they are mixed so that nearly all of this high No. 2 being put with the low No. 1 makes it all practically No. 1. That is how the farmer is euchered out of it a little.

The CHAIRMAN. Not necessarily. He may have sold his grain for just what it was, and a mixture of the two makes a higher grade; but the farmer who sold No. 1 and the farmer who sold No. 2 got their price all right. The mixture may have enabled the elevator man to grade it up a little higher.

Mr. DAVIS. It is all No. 2 that weighs from 55 to 57 and No. 1 that goes from 57 to 58 or 59, and that is where the farmer gets a little the worst of it.

Mr. GALLOWAY. Mr. Chairman, the farmers are all such good farmers up there in your section and so familiar with all these things that it is hardly fair to judge all the rest of the farmers by them.

The CHAIRMAN. We have such soil and climate, etc., that we raise good wheat in spite of what anybody can do.

Mr. DAVIS. It does seem to me that the farmers' wheat ought to have a standard grade so that when an attempt is made to inspect it, there ought to be definite knowledge on the part of the inspector so that he can grade that wheat so that it will pass to the markets.

The CHAIRMAN. To accomplish that, you would have to have a Government inspector at every warehouse all over the United States, from the Atlantic to the Pacific.

Mr. GALLOWAY. What we hold is that there are certain fundamental things that can be determined definitely, and that those fundamental things, if established by the Government and insisted upon by the Government, just as we insist on certain fundamental things in connection with the adulteration of seed, will become standard, just as much as the Babcock milk test has now become a standard everywhere in the country in the buying of milk by the creameries or elsewhere.

The CHAIRMAN. If you can establish some mechanical test that is within the reach of every farmer of the country, that will be something practical.

Mr. GALLOWAY. That is what we want to do.

The CHAIRMAN. That would be satisfactory, because it would be a mechanical test.

Mr. GALLOWAY. I was making a statement that was not so much for the interest of the farmer, that he should know that and have a grade that he could appeal to; but that it should be the policy of the Department to try to induce all of these inspectors to adopt that standard as a uniform standard.

The CHAIRMAN. If you can invent a machine that will do this work you will find that every board of trade will instantly adopt it because it will do away with all the disputes at either end.

Mr. GALLOWAY. That is the line we are working on, and no other line.

The CHAIRMAN. But I do not believe you can do it by any system of Government experts at local stations.

Mr. GALLOWAY. Mechanical devices for determining moisture, impurities in seed, and a color standard—those are things, it seems to me, which could be worked out.

Mr. HAUGEN. I would like to ask, Doctor, if any of the foreign countries require this inspection of grain and lumber that has been referred to?

Mr. GALLOWAY. Do any foreign countries require it?

Mr. HAUGEN. Yes; do they require that the grain has to be inspected before it can be exported?

Mr. GALLOWAY. In foreign countries they require a certification that meat is wholesome.

Mr. HAUGEN. It has to be inspected in order to get a certificate?

Mr. GALLOWAY. It has to be inspected to determine that. There are foreign countries, however, that have systems of grain inspection. Russia has such a system.

Mr. TRIMBLE. I want to ask the Doctor what has been the result of his work in regard to the investigation of seed adulteration.

Mr. GALLOWAY. During the last year there was incorporated into the bill a clause directing the Secretary of Agriculture to purchase

seed in the open market, and where he found such seed adulterated to publish the names of the firms that were selling the adulterated seed and the names of the seed that were used as the adulterants. In carrying out that authority we have made purchases of over 1,200 samples of seed in the open market, and out of that total number we have found 221 samples that were adulterated.

The CHAIRMAN. Out of 1,200?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. That is about 15 per cent, is it not?

Mr. GALLOWAY. About 15 per cent. Of these samples of seed secured, of red clover we have 3 samples adulterated, of alfalfa 42 samples, of orchard grass 133 samples, and of Kentucky bluegrass 43 samples. We have issued already two circulars in which we quote the law and give the names and addresses of seedsmen from whom we purchased the seed, the character of the adulterants, and the percentage of adulteration.

Mr. SCOTT. Was the character of the adulterants such as to make it clear that the adulteration was done deliberately or that it merely had happened by the gathering of mixed seed?

Mr. GALLOWAY. The most of it was such as to show that it was done deliberately. Reading down the line, we have as percentages of total adulterants 43 per cent, 41, 34, 10, 44, 42, 36, 34, 10, 35, 39, and so on.

Mr. TRIMBLE. That is the percentage?

Mr. GALLOWAY. That is the percentage of total adulterants.

Mr. TRIMBLE. You have published these, have you?

Mr. GALLOWAY. Yes, sir.

Mr. TRIMBLE. Have they gone out to the public press?

Mr. GALLOWAY. Yes; they have gone out through the country.

The CHAIRMAN. How many names are there on those lists?

Mr. GALLOWAY. There are 22 cases.

The CHAIRMAN. Are their addresses given?

Mr. GALLOWAY. Yes, sir. I notice here that the first five of them are from New York State.

Mr. SCOTT. Have you had any suits for libel?

Mr. GALLOWAY. No, sir.

The CHAIRMAN. I will now, with the permission of the committee, direct that those lists go into the record. I hear no objection, and you will hand it to the stenographer, and let it be put in the record.

The papers referred to are as follows:

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
Washington, D. C., January 23, 1906.

In carrying out the clause in the bill making appropriations for the Department of Agriculture directing the Secretary of Agriculture to obtain samples of seed in the open market and to publish the results of the tests of samples found to be adulterated, about 1,250 samples were obtained from seedsmen in the open market by agents of this Department. These have been examined for adulterants, with the result that the following number of samples were found to be adulterated:

	Samples.
Red clover.....	3
Alfalfa	42
Orchard grass	133
Kentucky blue grass.....	43
Total	221

The only adulterant found with red-clover seed was yellow-trefoil seed. This has also been found frequently in alfalfa seed. Yellow trefoil is a small, low-growing, clover-like plant, grown on poor land in Europe, but it is of no value on land capable of producing alfalfa. The seed is so similar in appearance as to be easily mistaken for either red clover or alfalfa unless samples are carefully examined. The seed which is used as an adulterant is all imported from Europe for this express purpose, where it can be had at about one-half to one-third the price of either red-clover or alfalfa seed. In the fiscal year 1903-4 about 250,000 pounds of yellow-trefoil seed were imported from Europe, and in the fiscal year 1904-5 about one-half that amount.

Alfalfa seed is sometimes adulterated with sweet-clover seed, but more frequently with bur-clover seed. The bur-clover seed used is a by-product obtained in cleaning South American wool. Low-grade alfalfa seed imported from Europe frequently contains a considerable percentage of this bur-clover seed.

The adulteration of Kentucky blue grass with Canada blue grass seed is a very common practice. There is annually imported from Canada from 600,000 to 700,000 pounds of this seed, which is practically sold as Kentucky blue grass. This is an especially bad adulteration, as the seeds of the two grasses are very similar in appearance. The price of Canada blue-grass seed is usually about one-half that of Kentucky blue-grass seed.

A large number of samples of orchard-grass seed have been found adulterated with varying amounts of English rye grass and meadow fescue, both of which are common agricultural grasses, but are sold at about one-half the price of orchard-grass seed.

Two publications giving the names of dealers selling adulterated seeds have been made—Circulars Nos. 12 and 14, Office of the Secretary, United States Department of Agriculture.

[United States Department of Agriculture, Office of the Secretary.—Circular No. 12.]

ADULTERATION OF ALFALFA SEED.

The act of Congress making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1905, contains the following item:

"The Secretary of Agriculture is hereby directed to obtain in the open market samples of seeds of grass, clover, or alfalfa, test the same, and if any such seeds are found to be adulterated or misbranded, or any seeds of Canada blue grass (*Poa compressa*) are obtained under any other name than Canada blue grass or *Poa compressa*, to publish the results of the tests, together with the names of the persons by whom the seeds were offered for sale."

Under date of May 25, 1904, a circular letter announcing that the collection and testing of seeds, as directed by this act, would begin July 1, 1904, was sent to the seedsmen of the United States whose names appear in the 1904 edition of "The American Florist Company's Directory of Florists, Nurserymen, and Seedsmen of the United States and Canada," and to wholesale seedsmen whose names are not included in that directory. A copy of the circular sent to the Florists' Exchange was published by that journal in its issue of June 18, 1904.

In carrying out the provisions of the act quoted above, in so far as it relates to alfalfa, offerings for sale were solicited through agents of this Department from 742 seedsmen. Upon examination of the samples of alfalfa seed obtained in the open market as a result of these negotiations 23 lots were found to be adulterated, as shown in the following table:

Results of tests of samples obtained in the open market as alfalfa seed and found to be adulterated.

Seed offered for sale as alfalfa by—		Seeds used as adulterants.		
Name.	Address.	Bur clover.	Yellow trefoil.	Total adulterants.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
Darrison, John T.....	13-17 Buffalo street, Lockport, N. Y.....		43.8	43.8
Do.....	do.....		41.64	41.64
Ebeling, F. H.....	217 Warren street, Syracuse, N. Y.....	4.06	30.22	34.28
Do.....	do.....		10.4	10.4
Harvey Seed Co.....	65-69 Ellicott street, Buffalo, N. Y.....	3.98	40.46	44.44
Do.....	do.....	3.6	38.86	42.46
Do.....	do.....		36.86	36.86
Jacot & Mullen.....	1 Water street, New York, N. Y.....		34.34	34.34
Do.....	do.....		10.7	10.7
Moody, J. A.....	13 South Phelps street, Youngstown, Ohio.....		35.62	35.62
Do.....	do.....		39.78	39.78
Small & Co., W. H.....	7 and 9 Upper First street, Evansville, Ind.....	3.82	39.82	43.64
Do.....	do.....	3.44	32.42	35.86
Do.....	do.....	4.38	41.74	46.12
Do.....	do.....	2.92	36.8	39.22
Do.....	do.....	2.88	24.44	27.32
Do.....	do.....	5.6	32.62	38.12
Do.....	do.....	3.86	30.74	34.6
Teweles & Co., L.....	113-119 Clybourn street, Milwaukee, Wis.....	11.84		11.34
Young & Halstead.....	Foot of Grand street, Troy, N. Y.....	5.06	17.02	22.08
Do.....	do.....	5.66	17.44	23.1
Do.....	do.....	6.74	15.22	21.96
Do.....	do.....	5.85	16.625	22.475

The Department takes this occasion to call attention again to its offer, repeatedly made in official publications, in circulars sent to seedsmen, and in announcements through the agricultural press, to test and report upon samples of seeds sent for that purpose by any farmer or seedsman.

JAMES WILSON, *Secretary.*

WASHINGTON, D. C., December 29, 1904.

[United States Department of Agriculture, Office of the Secretary.—Circular No. 14.]

ADULTERATION OF ALFALFA AND RED CLOVER SEED.

Seeds of alfalfa and red clover have been obtained and tested in accordance with the following paragraph contained in the act of Congress making appropriations for the Department of Agriculture:

"The Secretary of Agriculture is hereby directed to obtain in the open market samples of seeds of grass, clover, or alfalfa, test the same, and if any such seeds are found to be adulterated or misbranded, or any seeds of Canada blue grass (*Poa compressa*) are obtained under any other name than Canada blue grass or *Poa compressa*, to publish the results of the tests, together with the names of the persons by whom the seeds were offered for sale."

In carrying out the provisions of this act 1,272 seedsmen were asked by special agents of this Department for samples of red clover and alfalfa seed, as offered for sale by them. From these seedsmen 658 samples were obtained and examined. As a result the following lots were purchased in the open market and found to be adulterated. In accordance with the mandatory nature of the act quoted above, publication is here made of the names and addresses of the seedsmen who sold the lots found to be adulterated, together with the percentages of adulteration in each lot.

Results of tests of samples bought in the open market as red clover seed and found to be adulterated.

Seed sold as red clover by—		Seeds used as adulterants.	
Name.	Address.	Yellow trefoil.	Total adulterants.
		<i>Per ct.</i>	<i>Per ct.</i>
Rawson & Co., W. W.	12 and 18 Faneuil Hall square, Boston, Mass.	10.55	10.55
Ross Bros.	90 and 92 Front street, Worcester, Mass.	26.85	26.85
Small & Co., W. H.	7 and 9 upper First street, Evansville, Ind.	14.08	14.08

Results of tests of samples bought in the open market as alfalfa seed and found to be adulterated.

Seed sold as alfalfa by—		Seeds used as adulterants.			
Name.	Address.	Sweet clover.	Bur clover.	Yellow trefoil.	Total adulterants
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
Barrett Co., The W. E.	65-87 Canal street, Providence, R. I.	3.47	32.86		36.33
Barteldes & Co.	1521 Fifteenth street, Denver, Colo.	16.86			16.86
Crossman Bros.	503 Monroe avenue, Rochester, N. Y.	5.02	39.48		44.50
Dallwig, W. E.	54 Juneau avenue, Milwaukee, Wis.	5.74			5.74
Everitt, J. A.	227 W. Washington street, Indianapolis, Ind.	4.27	38.43		42.70
Do.	do.	3.90	39.53		43.43
Gregory & Son, James J. H.	Marblehead, Mass.	3.00			3.00
Grossman, W.	15 Bollingbrook street, Petersburg, Va.			1.25	1.25
Hamilton Bros.	Cedar Rapids, Iowa	5.49			5.49
Huntington & Page.	130 E. Market street, Indianapolis, Ind.	3.37	38.54		41.91
Kirchner, Jacob F.	156 North street, Pittsfield, Mass.	9.52			9.52
McMillan Seed Co., L. D.	23 S. Broad street, Atlanta, Ga.		10.04		10.04
Martin, B. E.	Main and Walnut streets, Salem, Ill.			6.98	6.98
May & Co., L. L.	381 and 383 Minnesota street, St. Paul, Minn.			31.77	31.77
National Seed Co.	101 W. Main street, Louisville, Ky.	16.53			16.53
Platt Co., The Frank S.	374 and 376 State street, New Haven, Conn.	5.88	39.85		45.73
Rush Park Seed Co.	Independence, Iowa	12.69			12.69
Steckler Seed Co. (Ltd.), J.	518-526 Gravier street, New Orleans, La.	2.57	.63		3.20
Young & Halstead.	Foot of Grand street, Troy, N. Y.		6.28	31.26	37.49

In order to aid seedsmen in avoiding the purchase of adulterated seeds, this Department will examine and report promptly as to the presence of adulterants in any samples of seed submitted for that purpose.

JAMES WILSON,
Secretary of Agriculture.

WASHINGTON, D. C., October 23, 1905.

Kentucky blue grass—Analyses of adulterated seed.

Test No.	Size of sample.	Offered by—	Address.	Adulterated with—		
				Canada blue grass.	Red-top.	Timothy.
				<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
33113	Mail sample.	Leonard Seed Co.	79-81 East Kinzie street, Chicago, Ill.	89.91		
33118 A	Bulk purchased.	do.	do.	83.25		
33125	Mail sample.	A. C. Brown.	217 South Fifth street, Springfield, Ill.	28.35		
33137	do.	Schisler-Cornell Seed Co.	St. Louis, Mo.	84		

Kentucky blue grass—Analyses of adulterated seed—Continued.

Test No.	Size of sample.	Ordered by—	Address.	Adulterated with—		
				Canada blue grass.	Red-top.	Timothy.
33137 A	Bulk purchased.	Schisler-Cornell Seed Co.	St. Louis, Mo.	Per ct. 8.67	Per ct.	Per ct.
33166	Mail sample.	Brewster, Crittenden & Co.	44 North St. Paul street, Rochester, N. Y.	23.77		
33166 A	Bulk purchased.	do	do	24.08		
33169	Mail sample.	E. E. Wheeler	1131 Main street, Bridgeport, Conn.	36.91		
33169 A	Bulk purchased.	do	do	30.89		
33231	Mail sample.	Ross Bros.	90 Front street, Worcester, Mass.	2.7	45.4	
33231 A	Bulk purchased.	do	do	19.32		
33232	Mail sample.	Joseph Harris Co.	Coldwater, N. Y.	18.55		
33232 A	Bulk purchased.	do	do	25.11		
33237	Mail sample.	Harmon & Harris Co.	Exchange and Federal streets, Portland, Me.	46.19		
33237 A	Bulk purchased.	do	do	46.19		
33298	Mail sample.	Young & Halstead	Grand street, Troy, N. Y.	59.9	2.9	4.1
33304	do	Martin C. Ribsam	Broad and Front streets, Trenton, N. J.	78.92		4.2
33338	do	Zack Davis Co.	Delaware, Ohio	23.23		
33367	do	M. F. Crissman	Manchester, Ohio	30.65		
33367 A	Bulk purchased.	do	do	21.49		
33387	Mail sample.	Denver Seed and Floral Co.	Denver, Colo.	29.3	17.56	
33387 A	Bulk purchased.	do	do	25.1		
33396	Mail sample.	Arthur G. Lee & Bro.	Fort Smith, Ark.	72.55		8.17
33396 A	Bulk purchased.	do	do	76.85		
33424	Mail sample.	Plant Seed Co.	814 North Fourth street, St. Louis, Mo.	55.13		
33424 A	Bulk purchased.	do	do	25.98		
33436	Mail sample.	M. G. Madison Seed Co.	Manitowoc, Wis.	41.56		
33441	do	John A. Salzer Seed Co.	La Crosse, Wis.	16.16		
33441 A	Bulk purchased.	do	do	22.74		
33454	Mail sample.	J. A. Everitt.	Indianapolis, Ind.	50.3		
33454 A	Bulk purchased.	do	do	35.99		
33467	Mail sample.	Frank H. Battles.	Rochester, N. Y.	19.32		
33492	do	Amzi-Godden Co.	Birmingham, Ala.	32.5		
33497	do	Zack Davis Co.	Delaware, Ohio	25.48		
33497 A	Bulk purchased.	do	do	21.02		
33499	Mail sample.	A. Tilton & Sons.	83 Woodland avenue, Cleveland, Ohio.	23.8		
33499 A	Bulk purchased.	do	do	25.3		
33567	Mail sample.	Curry-Arrington Co.	Rome, Ga.	21.54		
33567 A	Bulk purchased.	do	do	27.74		
33565	Mail sample.	Griswold Seed Co.	Lincoln, Nebr.	47.55		
33565 A	Bulk purchased.	do	do	42		

Mr. FIELD. Doctor, in what variety of seed do you find the highest percentage of adulteration?

Mr. GALLOWAY. Alfalfa seed, usually; and also in the Kentucky blue-grass seed. About 700,000 pounds of Canadian blue-grass seed was brought in this last year—

The CHAIRMAN. Who is the guiltiest party in selling that blue-grass seed? Have you a record there?

Mr. GALLOWAY. The circular on the blue-grass seed is just being prepared now. The two I have here pertain to clovers and alfalfas only.

Mr. SCOTT. The Kentucky blue-grass seed is usually adulterated with an inferior blue-grass seed, is it?

Mr. GALLOWAY. With the Canadian blue-grass seed, which is worthless for planting in this country.

Mr. SCOTT. How about alfalfa?

Mr. GALLOWAY. Alfalfa is adulterated with yellow-trefoil seed, which is also a worthless plant in this country. It is a little, yellow thing that grows on the ground.

Mr. HAUGEN. Doctor, do you go into the markets and buy these things?

Mr. GALLOWAY. Yes, sir.

Mr. HAUGEN. Do you make an effort to secure samples from each dealer?

Mr. GALLOWAY. We secure samples always indirectly. We do not go directly to a dealer, because that would not do; but we buy through a third party. The samples are sent in to us and are examined in our laboratories, and if there seems to be any doubt about the matter at all we get further samples. The first examination is made, and then we buy a larger sample.

Mr. HAUGEN. If the quality is good and pure, no mention is made of it?

Mr. GALLOWAY. No, sir.

Mr. SCOTT. If it is found to be adulterated, do you notify the man who has been selling it?

Mr. GALLOWAY. Yes.

Mr. SCOTT. Have you had any protests?

Mr. GALLOWAY. Yes; a great many. All of them protest. The papers have been full of all sorts of things. A question arose in our minds as to the constitutionality of this clause, and we submitted the matter to the Attorney-General, and he said that it was perfectly constitutional, to go ahead and publish the names. We are looking out for libel suits.

Mr. BROOKS. What results did you get? Do they stop selling these adulterated seed or not?

Mr. GALLOWAY. We have not been going long enough to know that. We will make another round and take in the same crowd, and continue in that line until we work it out in some practical way.

Mr. TRIMBLE. Do you buy altogether from wholesale dealers?

Mr. GALLOWAY. Wholesale and retail.

As I was saying, 700,000 pounds of Canadian blue-grass seed was brought in last year, and every pound was used for adulteration; not a pound was used for any other purpose. There was imported last year 250,000 pounds of this yellow-trefoil seed, and it was used for adulteration. It is not used in this country for any other purpose.

As to bur-clover seed, we can not get any records of that, because the adulterant that is used is the seed that is extracted from the South American wool. It is cleaned out of the wool and then brought up here by these fellows at a cheap rate and put into these seed. We know it is taken out of the wool, because we find the little wires from the cleaning machine in the seed.

The orchard-grass seed is adulterated largely with English rye grass and meadow fescue, which are very cheap grasses, and we had 133 cases of orchard-grass seed adulterated out of the samples that were brought in. I have samples here of all these kinds of seed.

The CHAIRMAN. The yellow-trefoil seed is very hard to distinguish from the alfalfa seed, is it not?

Mr. GALLOWAY. Yes. Mr. Chairman, in the dissemination of these things we send them out to the entire list of crop reporters throughout the United States. The number who got them was something like 85,000, and the matter got into all the papers.

The CHAIRMAN. It would be a good thing to send it to the agricultural papers.

Mr. GALLOWAY. We do send it to the agricultural papers also.

The CHAIRMAN. Do they publish it?

Mr. GALLOWAY. Not generally so. They do not generally publish the name of the dealers.

The committee, at 12 o'clock meridian, adjourned until Thursday, January 25, 1906, at 10.30 o'clock a. m.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 25, 1906.

The committee met at 10.30 o'clock a. m., Hon. J. W. Wadsworth in the chair.

The CHAIRMAN. Gentlemen, Mr. Pollard, of Nebraska, wants a few minutes of our time to speak in regard to a bill he has introduced, and the committee will hear him first.

**STATEMENT OF HON. ERNEST M. POLLARD, REPRESENTATIVE
FROM NEBRASKA.**

Mr. POLLARD. Mr. Chairman and gentlemen of the committee, I have introduced a bill, the number of which is 9340. It is short, and I will read it, so that you may all understand just what it is:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of \$10,000 be, and the same is hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to be used by the Department of Agriculture in demonstration experiments for the purpose of controlling important diseases of orchard fruit, such as scab, bitter rot, and other kindred troubles.

In connection with this bill I would like to call the attention of the committee to certain conditions that exist in the Mississippi Valley. This matter was never brought vividly to my attention until last year, when I served at the Louisiana Purchase Exposition in the capacity of superintendent of horticulture from my own State. We carried an exhibit there that ran through the whole season, and there were 34 States and Territories, I believe, represented. I had a good opportunity to study this question from the whole country, but especially was it true of the trans-Mississippi Valley.

In the fruit that was exhibited there anyone who was at all familiar with fruit could go over that hall and pick out the apples that had been sprayed. Fruit that was placed on exhibition that was not sprayed was really not fit to be placed on the tables. We finally decided that we would not put on the tables any fruit that came to us that had not been sprayed. We did not consider it fit for exhibition, and there were only two or three orchardists from my State who sent sprayed fruit that we could use. The same relative proportion existed in all States of that region.

The people out there have been working for fifty years trying to determine what varieties of fruit are adapted to that section of the country. The pioneers of the Middle West have been working at this, and we have now reached a point where we know and have demonstrated, where we have placed our fruit in competition with the

fruit from other States of the Union, that in that great section of the country we can grow just as good fruit as they can in New York, Michigan, California, or any other State in the Union of the same latitude; but just as we reach this point where we have demonstrated that we can grow good fruit and any quantity of it, and when we have demonstrated also that we know just what varieties of fruit to plant—that is, fruit acclimated to that section—we are brought face to face with these pests, such as bitter rot and the scab fungus and other parasites and pests of that character.

The reason I would like to have this additional appropriation is that I believe in the estimates submitted by Doctor Galloway for this work, or for work in this Bureau, he is asking for the coming fiscal year a little over \$8,000. Is not that correct, Doctor?

MR. GALLOWAY. There is an increase of \$8,000 for extra work in tobacco. The matter was discussed before the committee yesterday or the day before. That is the total increase for the pathological investigations.

MR. POLLARD. Eight thousand dollars?

MR. GALLOWAY. Eight thousand one hundred and sixty dollars.

MR. POLLARD. That is an increase?

MR. GALLOWAY. Yes.

MR. POLLARD. I did not understand that. What we desire, or what I should like, is to have this appropriation made so that the Department can send some experts from the Department out there to make demonstrations. I am a fruit grower myself, and have been engaged all my life since I have been grown in the fruit business, and I know the value of the treatments that the Department of Agriculture recommends for these troubles from my own experience in my own orchard; but the Department has gathered this great fund of information that will tell the people how to control these pests, and yet the information has not reached the people. They have been sending out bulletins year after year for the last ten years, and yet I believe I can truthfully say, and I would be willing to do so in any section of that country, that there are not to exceed 50 orchardists west of the Mississippi Valley and east of the Rocky Mountains who practice spraying of their fruits. The percentage is that small.

To give you an idea of the extent of the fruit interests out there, there are, according to the last census, something like 92,000,000 apple trees in that section, and those trees, I think, according to the census, are producing annually something like 60,000,000 bushels of apples, or two-thirds of a bushel of apples per tree. This shows the very low yield, and it is due almost entirely to the fact that the people do not understand the treatment of these diseases and do not know how to correct them.

THE CHAIRMAN. Is it not also due to the fact, Mr. Pollard, that they have found other lines of agriculture more profitable?

MR. POLLARD. No, sir; not altogether, I think, Mr. Chairman.

THE CHAIRMAN. That belt you speak of is, generally speaking, the great cattle, corn, and hog belt.

MR. POLLARD. That is true, but a farmer can get more money out of a small orchard of 4 or 5 acres that is well taken care of, well pruned and sprayed, than he can from 50 acres of his land put into any kind of grain he sees fit to put it into. They have been taking care of their orchards until they encountered these pests. They have

been pruning them and giving them the best care, and the orchards have been one of the best sources of revenue on the farm until these pests came. Now they do not know what to do. They have become discouraged, and a good many of the orchards in my district have been grubbed out.

I would like to have this money appropriated for the purpose of making demonstrations, so that they can send men out there and do the same as they did last year in California in combating the pear blight and down in the Virginias in combating the bitter rot. I would like to have men go all through that section and make demonstrations here and there, showing conclusively to the people what the effects of spraying are, so that we can save the orchards. If they can not do this, I feel sure it is going to be very harmful to the whole fruit interests of the Middle West.

The CHAIRMAN. What is your State experimental station doing along these lines?

Mr. POLLARD. They have done quite a little work, although they have not gone into the work to anything like the extent the Department has here.

The CHAIRMAN. The right treatment being understood, the mere act of spraying is easily learned. The right mixture—Bordeaux, or whatever it may be—being known, anybody can demonstrate the act of spraying, can they not?

Mr. POLLARD. That does not seem to be the case. The best answer I can make to that is that bulletins have been sent from the Department here and from our State department right along for a number of years and the farmers have not taken it up.

The CHAIRMAN. Do you not think they are engaged, as I said before, in something more profitable, from which they can not be at present diverted?

Mr. POLLARD. It is certainly profitable.

Mr. SCOTT. You said a moment ago, did you not, that you are practicing the teachings of the Department in your own orchard?

Mr. POLLARD. Yes, sir.

Mr. SCOTT. And doing it successfully?

Mr. POLLARD. Yes, sir.

Mr. SCOTT. Why does not that constitute a demonstration for your neighbors?

Mr. POLLARD. It does right in that vicinity, and the farmers there are beginning to make preparations to spray. Right in that connection let me say we have been spraying now for three or four years, and when we started in our neighbors made all sorts of fun of us. That illustrates the way they look at it. They think it is impracticable and of no use. I have had neighbor after neighbor tell me that I was just wasting my time and money in spending days and days in our orchard with a sprayer. Of course, we have a very large orchard and it requires a great deal of time and expenditure of money, but that is incidental.

Mr. LEVER. And your experience has been that the bulletins do not count for very much value unless you actually demonstrate to the farmer the information given in the bulletin—unless you show him?

Mr. POLLARD. That seems to be the case to an extent at least.

Mr. LEVER. In other words, the American farmer is like the fellow from Missouri. He has got to be shown always.

Mr. POLLARD. That is usually the case.

Mr. SCOTT. Were you not a little underestimating it when you said you did not believe to exceed fifty orchardists in all that region were practically applying those teachings?

Mr. POLLARD. No, sir; I do not believe I did.

Mr. SCOTT. I know in my own county, which is not especially a fruit-growing county, every farm has its little orchard.

Mr. POLLARD. Yes.

Mr. SCOTT. But the people there understand perfectly well, and have understood for three or four years, that they can not raise any fruit unless they spray their trees, and everybody acts on that understanding.

Mr. POLLARD. Do they spray them?

Mr. SCOTT. Certainly they do. The big orchardists in my section all practice spraying. For instance, in one county I know of, at a little bit of a country station, there was shipped out of one orchard 200 carloads of apples this past fall, an abundant crop of excellent fruit, and it was a common saying around there that they got it by careful spraying in their orchards.

The CHAIRMAN. Ninety-nine per cent of the farmers in that country are not engaged in fruit culture specifically, are they?

Mr. POLLARD. Not as a commercial enterprise; no. There are very few that are engaged in it as a commercial enterprise. Of course, as Mr. Scott says, wherever you find a man engaged in it as a commercial enterprise he is spraying. He has to. He realizes that unless he does his business is a failure from the commercial point of view.

Mr. SCOTT. And it seems to me that that very fact is in itself a demonstration that is spreading this information just about as rapidly as we could expect to spread it by sending men out from the Department.

Mr. POLLARD. Of course I hardly think that is the case. I speak more from my experience in my own State than I do, of course, from the experience of the gentleman's country. I do not pretend to speak for that. My district covers virtually the whole fruit section of Nebraska. My district runs from the Platte River south to the Kansas line, and that includes Lancaster County, which runs out about 50 miles east of the river. That is the oldest settled portion of the State and virtually covers the whole fruit section. I do not mean to say there is no fruit grown outside of that section, but we cover the bulk of it, and in my whole district I only know of two other men who spray besides myself, and I am well acquainted with all the fruit men of that section. The trouble is they have not faith in it. As to the suggestion made by the chairman that they are engaged in other occupation that is more profitable—

The CHAIRMAN. I will not say more profitable, but which they have found profitable and are satisfied with.

Mr. POLLARD. Corn is our staple out there.

Mr. DAVIS. Other occupations in which they have had more experience. That is the point.

The CHAIRMAN. A dry goods merchant does not change his business because he is told other business is more profitable. If his dry goods business is profitable he is prone to travel along those lines.

Mr. POLLARD. That is true; but I think this is also true the country over, that the great bulk of the fruit of the country is grown by the

small orchards, not by the great commercial orchards. We have them, of course, all over the country where they make it a special business, but I think if you will examine the statistics you will find the great bulk of the fruit is grown by the small orchardists, men who have from 1 to 10 or 15 or possibly 20 acres in orchards.

Now, unless something is done so that these men can understand the value and the good results that follow spraying, I know in my section it is going to injure the fruit interests there very materially. I want to save the small orchardist. The big orchardist will take care of himself. He is impressed with the importance of spraying and will take hold of it; but I want to save the men engaged in it on a small scale, the men who really make the great bulk of our fruit products. They ought to be taken care of.

Mr. SCOTT. Do you have farmers' institutes in your neighborhood?

Mr. POLLARD. Yes, sir; we have them all over there.

Mr. SCOTT. You have attended those institutes, have you not?

Mr. POLLARD. Yes, sir.

Mr. SCOTT. And you have probably talked to the farmers on the advantage and profit of spraying their trees?

Mr. POLLARD. Yes, sir; I have.

Mr. SCOTT. Do you not think they believe what you say?

Mr. POLLARD. Yes; I think they do; but they think it is impracticable. As I said a moment ago, they made fun of me for spraying at home. They said it would not do any good, and it is only in the last two years, when we have had an immense crop of fruit and none of our neighbors have had any, that they have begun to awaken to the fact in that community that spraying pays. That, however, only goes out a short distance, just in that immediate locality.

Mr. SCOTT. The capillary attraction of news like that will carry it pretty far in a very short time, it seems to me.

Mr. POLLARD. The only answer I can make to that is that it does not in our section, anyway. It seems to me this way: This is only a very small amount. When you take into consideration the good that can be done and the fact that it will add so very materially to the wealth of that great section of the country, \$10,000 is nothing in comparison with the increase in the wealth of the country that would follow the demonstration to the people out there that this process is a success, and enable them to save their fruit.

Mr. CANDLER. Do you think if the Government sends out somebody it would have more influence than a demonstration made by a private individual?

Mr. POLLARD. I do not know that it would. The only trouble is, the private individual can not do that.

Mr. DAVIS. Do you not think, if you had time to devote to it—a month or two in the State of Nebraska alone—you could increase the supply of fruit and the quality also?

Mr. POLLARD. I have no doubt I could.

Mr. DAVIS. But, as a private individual, you do not feel like doing that. You think one or two agents or men from the Department, who would spend three or four days at a certain point, well advertised, would have the desired result?

Mr. POLLARD. Yes, sir; that was my idea.

Mr. DAVIS. I agree with you on that.

Mr. POLLARD. It seems to me the expense entailed is very small in proportion to the good that would result.

The CHAIRMAN. Do you not think, acting on that theory, you might as well do away with your experiment station entirely and let this Department do the whole of it all over the United States? We keep losing sight of the fact that we have experiment stations that are manned by certainly not incompetent men, and once the medicine you want to apply is known, the mere application of it, the ocular demonstration of the application of it, can be done at a very small cost and ought to be done by the State. Why go to Uncle Sam for everything?

Mr. POLLARD. That is the point exactly. What is the use of maintaining these experiment stations and this great army of experts down here to acquire the information if they can not carry it to the people and let the people get the benefit of it?

The CHAIRMAN. I think it ought to be done by the experiment stations.

Mr. POLLARD. The question is, What is the best method of carrying that information to the people? There is no doubt but what we have the information.

The CHAIRMAN. We agree on that. It ought to be done as far as possible by ocular demonstration, but I maintain it ought to be done by the experiment stations. If the scientists of the Department have discovered the remedy—the medicine—the mere application of the medicine is a very small matter. If you discover the remedy for typhoid fever, it is a very small thing to put in a spoon and put it in the patient's mouth, and the experiment station ought to do that. It can be done by men at a dollar or two dollars a day instead of sending men whose time is extremely valuable in scientific research.

Mr. DAVIS. But, Mr. Chairman, do you not as a rule have to send the doctor to the patient?

The CHAIRMAN. The doctor has been supplanted a great deal by the nurse. After the doctor has diagnosed and prescribed, in nine cases out of ten the professional nurse takes his place.

Mr. DAVIS. These experiment stations are doing good work, but have they funds to send out men?

The CHAIRMAN. If they have not, they ought to have. There is not a State in the Union that is so poverty stricken that it can not do it.

Mr. POLLARD. It seems to me this way: The Department has been down through the South making demonstrations as to the control of the cotton-boll weevil. They have gone out into California and made demonstrations as to the control of the pear blight; they have gone down into Virginia and West Virginia and demonstrated that the bitter rot can be controlled; and now it seems to me it is not asking too much for them to go out into that country and make demonstrations that will enable the people of that great section of the United States to control the pests that are destroying their fruit.

The CHAIRMAN. That is very true. They probably have gone to those sections where the need was the greatest, and other sections will be taken up in their order. The whole country can not be covered in a year or ten years, I suppose.

Mr. POLLARD. Of course, if I were attempting that, I certainly would have to have a larger appropriation than \$10,000. It would not be a drop in the bucket.

The CHAIRMAN. I may be a crank on this subject of experiment stations, but I believe they ought to be made to do more work, and Congressmen ought not to come to Uncle Sam for everything. We ought to maintain here the best scientists in the world, and I think we have them.

Mr. POLLARD. There is no question about that.

The CHAIRMAN. After they have discovered the remedy, the States and the individual, through the experiment stations, if you please, ought to apply it.

Mr. SCOTT. I would like to ask this question, perhaps of Doctor Galloway, whether the comparison which Mr. Pollard has just made is an entirely fair one in this respect: Mr. Pollard just referred to the fact that demonstrations were made in various portions of the South in connection with the cotton-boll weevil and to show that the pear blight could be controlled in orchards, and other things of that kind. My understanding has been that those were not demonstrations so much as they were experiments; that the scientists were sent down there to experiment and hunt around until they could find the proper remedy, and when they had found the proper remedy no more money was spent in demonstrating there than was spent in demonstrating other things in other parts of the country. I wonder if that is true?

Mr. GALLOWAY. I think that is a correct statement of the situation, Mr. Chairman. I might add that two of the cases that Mr. Pollard mentioned—the cotton-boll weevil and the pear-blight troubles—are really threatening entire industries. They are emergencies that we must meet, like the foot-and-mouth-disease emergency that broke out in New England a few years ago and the pear-blight work in California. We have an industry there worth, perhaps, ten or fifteen million dollars, and unless something is done and done at once the whole thing will be wiped out. In the case of the cotton-boll weevil and the work in the South, the work there has had as much for its object the determination of the best thing to do as the way to do it. It has been really in the nature of experimental work, and so it was with the bitter-rot work in Virginia this year. We did not know just how to do the work until we made the discovery this last season.

Mr. SCOTT. It was not a mere demonstration of an old, long-settled fact?

Mr. GALLOWAY. No, sir. There may be questions in connection with the work in the Middle West and doubtless are questions that would involve experimentation.

Mr. POLLARD. May I ask the Doctor a question? Do you not think, Doctor, that unless the people in that section can come to understand the ravages of the scab fungus, especially, it is going to result in the destruction of our industry there in time?

Mr. GALLOWAY. I think it undoubtedly will lead to serious damage, and the educational movement in respect to getting those people to take hold of these things certainly has not been as rapid in the Middle West as it has been in other sections of the country. Whether the reasons given for that by the chairman are correct I am not in a posi-

tion to say. I am not ready to say, either, that these people are not more alert than people in other sections, but they certainly have not taken advantage of information given out by the Department and experiment stations. In my own State—Missouri—one of the largest apple-producing States in the country, spraying is practiced extensively, and the State station, through Professor Whitton, the horticulturist, is conducting work along spraying lines, and the State has appropriated \$15,000 and has a special station there for the demonstration of some of these problems.

The CHAIRMAN. They are probably using the cure that was found by the scientists here.

Mr. LAMB. Let me ask you right there, Doctor, does not the educational literature sent out from your Department as well as from the State experiment department teach the importance of this thing, and, if they will not be convinced by that, will they be convinced by demonstration?

Mr. GALLOWAY. We are trying in every way we know how, by farmers' bulletins and in other ways; but the fact remains, Mr. Chairman, answering Mr. Lamb's question, that after all the farmer and fruit grower is the most conservative of all men. He must be; otherwise he can not exist very long. If he listened to all the suggestions and advice given him, he would soon be lost. I do not blame him for being conservative, but at the same time it is an uphill struggle to get even what appear the simplest things introduced into their operation; and we are coming more and more to realize the fact that demonstrative work is the kind of work that must be done to bring the matter right home to the farmer. As we grow in that knowledge we are giving less and less attention to what might be termed "long-range educational methods" and more and more attention to bringing the work right home to the man in the field. As the Secretary says, the man with his coat off is the man we want to meet. That has been our line of procedure in the South in the last two or three years, and I think we have accomplished more in that time with our demonstration work than we had accomplished in years before with all the publications we have sent out.

The CHAIRMAN. Is it not a fact also, right in that connection, that the South has suddenly realized that she had to go into diversified farming; that she can not trust her fortunes to one crop?

Mr. GALLOWAY. Yes. Just such a thing as the invasion of the cotton-boll weevil is a thing that will act immediately on the farmer's mind and completely change his view point. And it changes his view point from the fact that unless he does change his view point he will have to go out of the farming business.

Mr. SCOTT. Doctor Galloway, have you given any thought or made any estimate at all as to whether the money which is now spent in printing and distributing farmers' bulletins might not be more advantageously used in sending out men to make practical demonstrations? In other words, could we save in one direction in order to spend in the other? You said, just a moment ago, that you believed that a little demonstration work was of more value than all the publications that have been made.

Mr. GALLOWAY. Yes; and I stick to that. I have not given any attention to that, but I have given considerable attention to another

line of work which may not have a direct bearing on this—that is, in connection with the seed work. There are certain demonstrations of the value of good seed and new crops in seeds that I am sure would go further toward improving the agriculture in this country than money spent in certain other directions. But on farmers' bulletins it is a difficult question to answer, because we do not know. We can not tell just how much preliminary education is necessary to get the farmer in the receptive mood for the demonstration work. We all know that all these bulletins that the experiment stations have been sending out, that the Department has been sending out, the work the farmers' institutes have been doing—that work has had a marked effect on the general knowledge that the farmer now possesses, and those who attended farmers' institutes ten or fifteen years ago and who attend farmers' institutes now would be struck at once with the great variety of knowledge that farmers possess and questions that farmers are able to discuss intelligently, all based on information that they have been able to secure.

Mr. LAMB. That is positively so.

The CHAIRMAN. I agree perfectly that ocular demonstration is better than the knowledge derived from reading in a book. It is more practical. Our State experiment station in New York will make anywhere in that State an ocular demonstration. It will go into a little community where the farmers ask for a demonstration and where the farmers furnish the land. For instance, take the sugar beet. I know there were several experiments made in raising sugar beets in my own county on account of the establishment of a factory at Lyons. That is an example of what I think they ought to do. I do not think they ought to come here to Uncle Sam for everything. To repeat myself, when a scientist here discovers a remedy the States ought to be willing to apply it.

Mr. POLLARD. Our State experiment station is doing a great work for the benefit of the State. There is no question about that; and it is being supported very liberally by our State legislature. It has done a great variety of work in a number of different lines, which has proven to be extremely effective; but this is a field they have not taken up to any great extent. They have been spending their energies along different lines.

The CHAIRMAN. Why is that? Why have they been bending their energies along different lines?

Mr. POLLARD. The only reason I can ascribe to it is that our country out there is new, and these pests, especially the scab fungus, are more or less new with us. It is only within the last five or six years that we have been having much trouble, and the energies of the Department have been directed in other lines prior to this. They are now working upon experiments that they made several years ago which are not finished. They are still engaged in that.

The CHAIRMAN. Where did you get the remedy that you apply to your orchard?

Mr. POLLARD. Where did I get it?

The CHAIRMAN. Yes; the formula for the mixture?

Mr. POLLARD. I got it from our State station.

The CHAIRMAN. Is it practically the Bordeaux mixture?

Mr. POLLARD. Yes; practically so; but I will say that while I have the highest regard for the scientists in our State station, yet the

formulas that they sent out, when it came to putting them into practical effect, had to be revised. Perhaps that has been the source of one trouble in the farmers using it, on account of the formula they gave. I know that formula ruined some of our fruit for us and we had to change it. If an ordinary farmer gets hold of a remedy of that kind he will discard it for all time.

The CHAIRMAN. I suppose those mistakes are apt to occur once in a while, though not often.

Mr. POLLARD. Yes. In conclusion I would like to say this: I do not care whether the resolution is passed as a resolution or whether it is incorporated in the appropriation bill. Either will be satisfactory to me; but I do think that with an enterprise, gentlemen, that is of so great importance as the fruit interests of the West, we certainly could afford to contribute this much to the General Government. We ought not to lose sight of the fact that the West is growing up gradually. We have reached the point out there where our farming must be more intensive in all lines. Not only that, but we have reached the point where we must diversify our crops. We can not depend altogether upon corn or wheat or stock, but we want a diversity. Here is a comparatively new crop that is capable of bringing more money to the farmer in proportion to the amount of labor that is expended than anything else he could do. The question is whether we are going to allow these ravages to go on and not let the farmer get in his possession information that will enable him to correct these evils, or whether we will carry that information to him. It seems to me there ought not to be any question about the propriety of it and the advisability of it.

I thank you for having given me such a patient hearing. I hope you will at least incorporate it in the appropriation bill.

STATEMENT OF B. T. GALLOWAY—Continued.

The CHAIRMAN. I think we yesterday finished the paragraph on botanical investigations. We now come to grass and forage-plant investigation and farm management.

Mr. GALLOWAY. Mr. Chairman, with your permission, I would like to again refer to the question of seed adulteration, and I have brought with me this morning, or it has been put into my hands since I arrived here, the final figures on the adulteration of blue-grass seed, which I will turn over to the secretary to be incorporated in the record.

These figures show that 24 firms have been handling and selling adulterated blue-grass seed, the adulterations running from 89 per cent down to 2 or 3 per cent, averaging, probably, from the looks of the figures, about 45 per cent. With one or two exceptions, the adulterant used was the Canadian blue-grass seed, of which 700,000 pounds, as I mentioned yesterday, were brought in from Canada for that purpose, and that purpose only.

The CHAIRMAN. The stenographer will insert this list at the same place where the other papers were inserted in yesterday's proceedings.

Mr. GALLOWAY. A few words further might be said in reference to our seed work. The Department is making a special effort toward encouraging the use of good seed, and its work in that direction is

done largely through propaganda efforts and sending out publications, attending farmers' institutes, and examining and reporting on seeds that farmers or seedsmen may send in. We examine in the course of a year many hundreds, perhaps thousands, of samples of seeds that farmers secure in the open market and, desiring to have an authentic test made of them, they are sent into the laboratory, are there tested, and a report made.

Another matter, which does not come strictly within this appropriation, but which has been referred to in connection with seed work, is the breeding of seeds, especially the high-bred corn seed. I have here a sample of Boone County white, which has now been bred four years and which last year produced 90 bushels to the acre on our breeding plots. The plan in this work has been to secure the plots on farms in different sections of the country representing the corn areas, and to start first with small areas and then go up to 5 or 6 or 10 acres, in connection with the farmer.

This Boone County white corn—it has been bred specially for the smallness of the cob; the cob has been bred down until it is almost out of it—may have a certain configuration or conformation which would classify it as a first-class corn, and yet it may not have the inherent qualities to give a high yield in another year that the same stock may have, so that in order to bring that out we make our first and preliminary tests with the individual ears and individual rows, and always select from the highest-yielding corn.

Mr. SCOTT. Have you bred this with any special reference to the protein content?

Mr. GALLOWAY. No, sir; that is bred primarily for yield. We have hominy corn, but we have done very little in the breeding of those special things. The Illinois Experiment Station has done special work in that line.

Mr. SCOTT. What do you call that corn?

Mr. GALLOWAY. Boone County white. We have four or five types, and we are breeding corn for different sections of the country. The corn we breed for the most southern sections is of course an entirely different type from this, and the basic idea that runs through this work is to have that corn, and other plants as well, possess the inherent quality of giving a high yield, which is not correlated with general appearance, although in most cases it is. In the old days of corn selection it was selected primarily and fundamentally from the good appearance of the ear and the weight; but a corn having all those points may still be a shy yielder, and that is only brought out when a certain number of grains are taken from a certain ear and the record is kept down through generation after generation.

The CHAIRMAN. Where was that corn raised?

Mr. GALLOWAY. This was raised in Ohio.

Mr. SCOTT. And yielded 90 bushels to the acre?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. How old is that ear?

Mr. GALLOWAY. It was raised last year.

The CHAIRMAN. In 1905?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. It is wonderfully dry.

Mr. GALLOWAY. Yes; in connection with the work we are carrying on considerable work in connection with the effect of kiln drying.

The CHAIRMAN. Is this ear kiln dried?

Mr. GALLOWAY. No; but we have found that the kiln drying does increase the yield under certain conditions.

The CHAIRMAN. Does it not deteriorate the germinating power?

Mr. GALLOWAY. No; it does not when it is properly kiln dried.

Mr. SCOTT. Do you know how close together that corn was planted which yielded 90 bushels?

Mr. GALLOWAY. It was planted the average distance, about three and a half feet. That is check corn; but there have been yields of corn, of course, that run very much higher than that. I believe South Carolina has the record for the prize yield of corn—something over 250 bushels, I believe.

Mr. LAMB. That man probably spent a thousand dollars on that acre.

Mr. LEVER. He got a prize of over a thousand dollars.

Mr. GALLOWAY. Mr. Chairman, I would like to read a sentence or two in reference to the matter of grain grading, which was referred to yesterday.

The CHAIRMAN. Very well.

Mr. GALLOWAY. This is a letter that came to the Department a short time ago from Consul Skinner, addressed to the Department through the Secretary of State. He was writing to the Department in reference to certain grades that had been adopted for macaroni wheat. In this letter he says:

I regret to state that the same difficulties in varying forms will be likely to come up from time to time, so long as the issue of grain-inspection certificates is subject to no central control, vested either in some appropriate department of the Government, or in some responsible voluntary association of the various commercial bodies now controlling not only our commerce in wheat, but many similar commodities, the aggregate exports of which reach many millions of dollars.

There is no substantial difference between the guaranties, or rather the absence of guaranties, on the face of grain certificates issued at Duluth and New York, although wheat exported from New York reaches the port of delivery in the hold of the steamer into which it was loaded, while wheat exported from Duluth is necessarily transhipped a number of times before reaching the foreign consumer. In the case of interior shipments, the foreign buyer has no means of absolutely knowing that the grain described in his certificate is the same grain actually delivered to him in Marseille. The logical result of this condition is, that the certificates issued at interior ports are accepted with hesitation, and that in many cases the buyer stipulates that he shall have a New York certificate, with the consequent effect that interior exporters are at a disadvantage, and a tendency to concentrate export business at New York or other final ports of departure, is unwittingly encouraged and sustained.

Then he speaks of some of the certificates accompanying wheat, and how they are worded. For instance, certificates issued at Duluth and St. Paul are supposed to conform. In the No. 1 durum wheat this is the basis of the certificate:

Shall be bright, sound, and well cleaned, and be composed of durum, commonly known as macaroni wheat.

The New York Exchange provides this:

No. 1 macaroni wheat: Shall be bright, sound, well cleaned, and be composed of what is known as rice or goose wheat.

He calls attention to the fact that these terms "rice" or "goose" wheat refer to wheats that were in use in this country ten or fifteen years ago, and are not the macaroni wheats at all, so that the foreign

buyer is confused in his mind as to just what he is getting and what he shall pay for. That was the point I was making yesterday as to the necessity of some standardizing of grains.

The next item is on page 17:

Grass and forage plant investigations and farm management: To enable the Secretary of Agriculture to conduct investigations of grasses, forage plants, and animal foods in cooperation with other divisions of the Department.

And some new matter has been added there:

To investigate systems of farm management and types of farming prevailing in different sections, the means used for maintaining soil fertility, and the methods employed in the production, utilization, and marketing of crops; to conduct demonstrations in improved methods of farming, and so on.

Mr. Chairman, the original work of this office, under the title of the Division of Agrostology, was conducted mainly along the lines of systematic work, as I discussed yesterday. That is the mere describing and picturing and calling attention to the different grasses and forage crops. Within the last five or six years we have completely changed the methods of work and are now conducting it in a way that has for its object the practical utilization of the forage crops and grasses. That is, instead of studying the systematic, scientific end of the thing, we are taking up a study of the grasses and their adaptation to different climates and soils, and the improvement of conditions in different sections through the development of new crops and the handling of new forage crops.

To the purely administrative portion of the work we are devoting \$11,807. The problems there have to do mainly with the handling of a large correspondence in reference to forage crops all over the country and the giving of assistance and advice, not only with correspondence, but with publications. In the purely botanical problems we are still carrying on that work, but the men who are doing it have been segregated and put into the old division of botany. We are spending \$3,700 in salaries only, and not spending anything in field work.

Our distinct problems connected with this work may be briefly reviewed as follows:

First, we have what we catalogue as our range and cactus work. In the range work we are conducting investigations in connection with the forest service in the matter of reseeding range lands where it is practicable to do so and where conditions exist that will pay to reseed.

Mr. SCOTT. You mean reseeding to the wild grasses?

Mr. GALLOWAY. Yes, sir; to the wild grasses. We are doing that not so much in the mere way of putting on seed, but we have systems of management. In the Santa Rita Reserve there have been about 50 square miles of country set aside for this experimental work, and part of it has been fenced and put under a system of management to prove that when properly handled the grass will come back. That work has been going on two or three years, the reserve having been set aside from the forest service.

Mr. BROOKS. That is the Santa Rita Reserve?

Mr. GALLOWAY. Yes, sir. We are conducting investigations in other sections of the country—in the more humid sections—in central Washington and the northwestern sections, in the matter of

improved meadow grasses, and we are making some special investigations of grasses and forage crops in the great southwestern country, especially such crops as salt bushes, which will grow in alkali land, and which are the only forage crops that can be grown in those regions.

The CHAIRMAN. Where have they been introduced from?

Mr. GALLOWAY. Mainly from Australia. They come from the dry regions of Australia, and those salt bushes are proving to be quite interesting crops.

In that connection, also, we have introduced quite a number of dry-land forage crops, and have introduced also from the Sahara country a number of alkali-resisting crops, especially alkali-resisting alfalfas—alfalfas that will grow in soil in which ordinary alfalfa will not grow. They have, through a long series of years, been adapted to these conditions. We have secured these seed through our explorers, and now have them growing in several sections.

The CHAIRMAN. What percentage of alkali will that alfalfa stand?

Mr. GALLOWAY. Do you remember, Mr. Woods?

Mr. WOODS. It is considerably above the limit of most alkali-resisting forms. I do not know the percentage.

Mr. GALLOWAY. It is often as high as a half of 1 per cent or 1 per cent.

Mr. BROOKS. One per cent is what I thought.

Mr. WOODS. It comes up very close to 1 per cent.

Mr. BROOKS. That is sufficient alkali to destroy all the other crops and leave a barren waste, is it?

Mr. GALLOWAY. Yes. We found some of these alfalfas growing in the Sahara country, where the Arabs have been using them a great many years and have developed them through a long process of adaptation, and they are the only alfalfas they depend on for their forage. Some of those alkali-resistant Arabian alfalfas have proved very high yielders. We have cut as high as 20 tons per acre from some of the alfalfas sent from Mexico.

Mr. WOODS. There is one thing Mr. Kearney discovered over there which has changed our view point on this work. In securing plants resistant to alkali in irrigated regions we have concluded that it is impracticable to produce plants that will meet the wide variations in the alkali contents of soil irrigation, but where a soil is dependent upon a normal rainfall the variation limits can be accurately determined, and we can secure crops and adapt them to those conditions, and bank on them; so that this resistant work must be transferred to farming under dry-land conditions.

The CHAIRMAN. Let me ask right there, although it is not quite relevant: Would it be dangerous to draw out silage as fertilizer on land you are going to sow alfalfa to next spring?

Mr. WOODS. I think not.

Mr. GALLOWAY. The only point in that, it seems to me, would be that it might increase the acidity of your soil to such an extent—

The CHAIRMAN. That is why I asked the question.

Mr. GALLOWAY. But a little mixture of gypsum with that would fix it all right. It would not only do away with acidity, but it would fix what nitrogen would escape.

The CHAIRMAN. What you call gypsum is the ordinary plaster?

Mr. GALLOWAY. Yes; used for sweetening stables.

The CHAIRMAN. Go ahead.

Mr. GALLOWAY. The cactus work of the Southwest has had for its object the working out of problems connected with the utilization of that great mass of forage that has been considered absolutely worthless. We have had some interesting results in the matter of using it as practically silage. It is being used now quite extensively not only by dairymen in San Antonio and other outlying cities where they have access to it and where it can be hauled in cheaply, but range men are also using it in times of stress. Two methods have been found for utilizing it and getting rid of the spines. The first is by a simple method of burning, using gasoline torches. The spines are simply burned off. The second, which is more simple, is to chop up the cactus by means of a simple machine and allow it to soak for about twelve hours in its own juice. Under those conditions the spines become softened and cattle will readily eat it. It is found to have about the same value as corn silage and when mixed with the proper grain to give it a balance has served as a valuable feed for dairy cows and also for fattening cattle.

We have published now one bulletin on the cactus investigations, as the result of the work, and are still conducting some problems on the chemical properties; but the problems we are especially interested in just at present have for their object the determination of just how long it takes these cacti to grow and whether they can be brought back on lands that have been denuded. These lands are practically worthless for other purposes, and when they are once cut off we found that cacti come back quicker than we supposed they would—in one, two, three, or four years. That work is going on in southwestern Texas. We are also doing some cooperative work with the Arizona Experiment Station in that field.

Mr. BROOKS. Doctor, what have you to say with regard to the work of Professor Burbank in regard to spineless cactus?

Mr. GALLOWAY. The spineless cactus has attracted a great deal of attention, and the Department has received and distributed many kinds of spineless cactus. Quite frequently we find growing on the western plains a purely spineless form, but the records seem to indicate that where there is a variety of that kind it does not very long exist on account of the jack rabbits and things of that kind, which soon destroy it. But the spineless cactus has been grown for many years in Italy, and we are distributing it now through a number of the Western States, in California, and the Southwest, with a view of having it tested. We brought those cacti in through our introduction work.

Mr. BROOKS. If it takes three or four years to grow a crop, there is no very great crop possible.

Mr. GALLOWAY. No. Another thing is, there would be no special advantage in growing the spineless cactus on the plains, where the native animals would soon destroy it, whereas the ordinary cactus is protected by its spines, and when you want to use it it is ready to use by the utilization of these machines and the burning process.

The CHAIRMAN. The cactus is used extensively for many purposes in Mexico, is it not?

Mr. GALLOWAY. Yes. I had with me this morning and intended to bring up here a material that is made from the cactus fruit. It is

called cheese, but it is more like a chocolate. It is quite a delicious confection. That is being made quite extensively in some of the Mexican States and also in the Southwest. They also make from it a sirup very much like the sorghum sirup.

The CHAIRMAN. The poorer people use the points for needles in Mexico, do they not?

Mr. GALLOWAY. Yes.

Mr. SCOTT. They make rope from the fiber of the plant and use it in a great many ways.

Mr. BROOKS. They use the interior for a lath. It makes a very fair sort of lath.

Mr. GALLOWAY. Another feature of this work has had to do with the regrassing of burned-over areas in the West. That has been carried on in cooperation in part with the stations of some of the States and in part with the forest service.

Especial attention has been given to the demonstration of wild grasses, particularly in the West. There are many sections of the West, especially in the higher altitudes, where wild grasses of certain kinds thrive well, and work has been carried on with the view of extending the areas of these wild grasses into other sections and extending the areas in their immediate vicinity. The grass seed is collected and cooperative arrangements are made with farmers for the handling of the crop. That work has been carried on mainly in some of the Western States.

Mr. SCOTT. Doctor, have you conducted any experiments in the way of restoring prairie grass to pastures that have been eaten out or tramped out?

Mr. GALLOWAY. Yes; that work is going on in connection with our reestablishment of range lands.

Mr. SCOTT. I mean, now, the blue stem, not the buffalo grass.

Mr. GALLOWAY. We have done very little in that blue-stem country. Most of our work has been done in the buffalo-grass region, where there are a number of leguminous crops, such as are found abundantly in the Santa Rita country. The photographs (made from a mountain 2 or 3 miles away) of that work where we have been carrying it on in the Santa Rita Reserve show a two or three hundred acre piece distinctly in its extra covering. That has been handled the last two or three years by the agent there, and a certain number of cattle allowed on it at certain times. This work has also developed the fact that the serious washing of those much tramped-over areas can be checked and stopped by very simple methods of handling.

The CHAIRMAN. Blue stem will stand as much tramping as any ordinary grass, will it not?

Mr. GALLOWAY. Yes.

The CHAIRMAN. It only disappears under extreme conditions?

Mr. GALLOWAY. In the overworked range lands in the West the cattle, in their search for grass, began to traverse the country—

The CHAIRMAN. And for water?

Mr. GALLOWAY. Yes. And to go in lines and paths, and then the rains came, and then the first thing they had was a gully.

Mr. SCOTT. Our experience in eastern Kansas has been that when a pasture was destroyed because too much stock was allowed on it, in the course of a few years there was practically nothing left but weeds, and I would like to suggest that if there is any way to restore the

blue stem to those pastures it would be a valuable contribution to our economy out there.

The CHAIRMAN. It comes from overstocking.

Mr. SCOTT. We have never found any way by which the blue stem could be restored.

The CHAIRMAN. It will not come back?

Mr. SCOTT. It will not come back. It may be abandoned and never touched with a plow, and not a stem will come back.

The CHAIRMAN. What is blue stem, exactly?

Mr. GALLOWAY. We call it sage grass in the East.

Mr. SCOTT. It is the long grass, as distinguished from the short grass, in our country. The buffalo is a short grass. It never grows more than 2 or 3 inches high, and covers the western arid plains; but the eastern part of Kansas in the beginning was covered by what we call blue stem, which is a long and very nutritious grass. When it is fresh and green in the spring it will fatten cattle faster than any other known forage.

Mr. GALLOWAY. We have a man who for the last year has been working on that problem and has been confining his work mainly to Montana, but he is working south. He is a Kansas man, a graduate of the agricultural college, and he has brought out the very fact that you are speaking of—the difficulty of regrassing these blue-stem lands when they are once denuded.

Seed habits are not understood. Special attention has been given also to the study of the forage crops for the Gulf coast region, where the handling of cattle has been increasing, and we have a number of stations established in the Gulf coast region, where we are conducting investigations in forage-crop lines.

The farm management work, which should be referred to here, and which this work is gradually being turned into, is a study of systems of farm management in different sections of the country, with the idea of taking advantage of systems where success is found and utilizing them in other localities. That is, a number of our men are studying systems of farm management in the New England States and systems of farm management in certain portions of the South, and we find here and there a successful farmer, a man who has worked out a system of growing crops, a system of the utilization of the animals as well as the plants, and we are cooperating with those men, the cooperation consisting for the most part in the keeping of records that we can use to determine the cost of production and the profits.

The expense involved is not great for each individual, but we are carrying a number of individuals which makes the aggregate expense in the neighborhood of eight or nine thousand dollars for that sort of work; but we believe that work is going to have an important bearing on our general work, especially as it will enable us to utilize in other fields the knowledge we possess.

For example, in some sections of the South we find the best system of farming that might be followed would be in connection with truck growing or fruit growing, or both combined. An example might be given of a case in Alabama where a large planter growing nothing but cotton expressed a willingness to change his system, and a plan was worked out for him, introducing gradually alfalfa on his place, and after the alfalfa was established, hog raising. He now has about 150 acres in alfalfa, and this last year he made nearly double as much

from his alfalfa and hogs as he did from his cotton; but he is going to alternate and work around his plantation, putting in alfalfa for four or five years and then putting that land in cotton for two or three years.

The CHAIRMAN. Will hogs live on alfalfa alone?

Mr. GALLOWAY. With a little corn.

The farm management work in connection with dairy farming has also been made a special feature. We believe that when we secure the information, the records, so that we can put this data into farmers' bulletins, and other publications, and use it in connection with our advisory work, which is extensive work, it will result in developing agriculture along a number of important lines.

We have not asked for any increase in this appropriation with the exception that there are three thousand and some odd dollars that have been expended in this fund which should be placed in the botanical fund, letting this fund remain as it is, so that we can increase this farm management work at the expense of the purely systematic work, which will go over on the other side.

The CHAIRMAN. Is that all you wish to say on that paragraph, Doctor?

Mr. GALLOWAY. I think that is all, Mr. Chairman.

The CHAIRMAN. The next item is "Experimental gardens and grounds."

Mr. GALLOWAY. It will take but a few minutes to go over that.

The work in experimental gardens and grounds has largely for its object the care of the grounds and care of the greenhouses and the conducting of some problems that are related to all lines of the Bureau work. We have 40 acres of grass to care for in the lawns and the greenhouses, and we also care for the grounds of the Weather Bureau—that is, we do not care for the grounds, but we propagate and prepare the plants for the grounds of the Weather Bureau.

The CHAIRMAN. Up on M street?

Mr. GALLOWAY. Yes, sir; and we propagate and send out a great many plants for outlying stations that belong to the Department. We are devoting to the salaries of the gardeners and laborers on the ground \$6,972. Our main expense there is for maintenance—that is, for heat and light. We pay for all the lighting of the grounds. That is an item of about \$1,300 annually. We pay for all the heat. We get our steam heat from the large power plant across the road. In a part of our greenhouses we have eliminated the coal question entirely and buy the steam direct.

The CHAIRMAN. You did that last year?

Mr. GALLOWAY. Yes; we did that last year. We pay for steam about \$2,500 a year and we save about \$500, but we still have to buy considerable quantities of coal for the other outlying buildings. That will be obviated, however, when we get our central heating plant. We are spending for maintenance \$13,347, making the total \$23,320, which is the total appropriation for the office.

These greenhouses are used, as I have just stated, for all lines of work. We have two houses that are devoted entirely to pathological investigations. We have two or three houses devoted to the propagation of these new plants that are brought in through our introduction work, and so on.

Mr. SCOTT. Do you not discover, in your work of keeping up the lawns about the Department, that the blue grass has to be nursed all the time?

Mr. GALLOWAY. All the time in this climate.

Mr. SCOTT. Is that due to climatic conditions or soil?

Mr. GALLOWAY. It is due to climatic conditions here. In the shade of trees and buildings the blue grass grows just as well as anywhere. If you take some of those evergreen trees a pyramidal shadow will form; you will find a sharp pyramid of blue grass on the ground where the shade of the summer sun is thrown, and we are incidentally doing a good deal of experimental work in that field in making tests of fertilizers, and so on.

There is one thing I might state in this connection which I think is having a far-reaching effect. We are giving opportunity on the Department grounds to the teachers of the public schools in this city in the matter of training them in elementary agricultural work. We have been doing that for the last three years, and normal school girls are now required to take a regular course in horticulture and agriculture.

That work is all done on our grounds in a greenhouse we have set aside for the purpose, and is looked after entirely by Miss Seit, who is detailed from the school. These young women who graduate from the normal school become the teachers in the Washington public schools, and they are taught by Miss Seit the elementary principles of agriculture in the matter of handling soils, growing seed, and making cuttings, and they are teaching that to the children, the idea being to use it in such a way that it will be broadening to the mind and at the same time may be correlated with their regular work, for example, in connection with the work of arithmetic in the public schools and the planting of crops on the grounds. The children are given certain sized areas to lay out. They are told that they must put on a certain amount of fertilizer per square foot and that the farmers use that fertilizer at the rate of 1,000 pounds per acre, and they must figure how much they shall use per square foot.

We have given them this year an acre of ground upon which the children will be required to plant the principal crops grown in this country, each sized plot representing the acreage, so that the children and the teachers who are working with the children, or the young women who will be teachers, will become familiar with the acreage and the quantities of the crop produced. This work has extended into other cities. Baltimore and Philadelphia are adopting it, and we publish a bulletin on school garden work which points out the lines of investigations that we have been calling attention to; and furthermore we have switched over some Congressional seed, made up into special packages, to this school garden work and are sending them to schools through the members who desire to have the seed go out in that way.

Mr. SCOTT. Reverting a minute to the blue-grass question, do you find that the trouble in this climate is principally due to too much sunshine or too little rain during the summer season?

The CHAIRMAN. Do you mean right in this section here?

Mr. SCOTT. Yes.

The CHAIRMAN. The trouble with blue grass?

Mr. SCOTT. Yes.

Mr. GALLOWAY. I perhaps did not make it evident a moment ago that on certain kinds of soils we can get blue grass—that is, on the limestone formation—but the difficulty here is due primarily to our hot summer sun and heavy rains—hot sun immediately following heavy rains. We have found by experience on our grounds that where we use an excessive amount of water the summer grasses will come in immediately—that is, these annual grasses—and then when the frost comes these grasses turn brown, and we have nothing but a brown mat.

Mr. SCOTT. What do you find to be the best fertilizer for blue grass?

Mr. GALLOWAY. The best fertilizer here is composted manure. That is what we use.

Mr. SCOTT. And of the manufactured fertilizers?

Mr. GALLOWAY. Of the manufactured fertilizers we prefer to use a complete fertilizer, but having the nitrogen applied in the form of a slow developing material, such as fish scrap, or something of that kind. Nitrate of soda will act completely in the spring. A complete fertilizer, containing about 4 per cent nitrogen, 8 or 10 per cent phosphoric acid, and 12 per cent potash makes a good combination, having the nitrogen, if you put it on in the early spring, in the form of fish scrap or tankage, but if you only intend to have some active stimulus use nothing but nitrate of soda and put it on in the spring at the rate of two or three hundred pounds per acre.

The CHAIRMAN. When ought blue grass to be sown in this country?

Mr. GALLOWAY. We prefer to sow it about the first week in September, to get a good start before winter comes on, and always sow white clover and redtop with it.

The CHAIRMAN. From a commercial point of view, blue grass is nowhere successful except on limestone soil, is it?

Mr. GALLOWAY. No.

The CHAIRMAN. You of course can grow it by applying these manures, but I would not advise Mr. Scott to try to raise it unless he has a limestone country.

Mr. SCOTT. I was asking these questions because blue grass is not natural to our country, and we have to nurse ours along, just in the way I see you are doing here in Washington.

The CHAIRMAN. I can not make a lawn here with all the nursing, Doctor.

Mr. GALLOWAY. The difficulty comes primarily from the invasion of these summer grasses.

Mr. SCOTT. That is what troubles us. We have a sort of crab grass that comes into the lawns, and it seems to have an everlasting life. You can not mow it often enough to kill it.

Mr. GALLOWAY. The more you mow it the more it spreads. We made an experiment in our grounds two years ago, and are still keeping it up. We have about an acre where an attempt was made to keep the crab grass out. The men mowed the lawn early in the spring, and the first sign of crab grass that appeared they cut it out with a knife. We keep it out in that way.

The CHAIRMAN. You can do it in a small area.

Mr. GALLOWAY. We can do it in a small area, but it can not be done on a large area.

To show what a marked effect limestone has on blue-grass production, there is a gentleman here to-day who came simply as a visitor, Mr. Counselman, who has a farm of 600 acres on the Western Maryland road. It is within 15 miles of Baltimore, and he is in a limestone region, and he has 200 or 300 acres of fine blue-grass pastures, have you not, Mr. Counselman?

MR. COUNSELMAN. Yes, sir.

MR. GALLOWAY. It is just as fine as you see anywhere in Kentucky or Missouri or up in your State, Mr. Chairman. Then you get down the other way on the Pennsylvania road and it is the most God-forsaken country one could see.

THE CHAIRMAN. Are you not on the Northern Central road?

MR. COUNSELMAN. Yes, sir; the Western Maryland—the Wabash system.

MR. GALLOWAY. Mr. Counselman also has 80 acres of alfalfa, which he cuts four times a year, and which could not be grown on any land except that strong limestone land.

MR. CANDLER. You spoke about a bulletin which you published in reference to this work done by the schools. Is that the only bulletin you have on that subject, or is there any other literature in connection with it?

MR. GALLOWAY. We have that bulletin on school garden work. That bulletin summarizes the work that is being done in nearly all of the principal cities in this direction, and gives in detail the work we are doing here. Then we have a number of circulars telling just what to do and how to make a school garden.

MR. CANDLER. The reason I asked for that information is that that is the very kind of work that has been made a part of the work of the public schools in our State. Do you remember the number of that bulletin, Doctor?

MR. GALLOWAY. That is 228. It is a bulletin prepared by myself, but issued by the Office of Experiment Stations, being a semieducational publication. We are preparing a farmers' bulletin on the same line, and I hope to get that in shape in a short time. This school garden work has been receiving my personal attention. My idea has been to encourage this work in the schools, with the idea of getting more of the city children to go back on the farms to make up for the farmers' children that are coming into the cities.

MR. BROOKS. What do you find to be the results? Do you get any results?

MR. GALLOWAY. Very encouraging results.

MR. BROOKS. I started out last year, and my free distribution was exhausted, so I bought a lot of seed and sent it to the school superintendents all over the State, and I got more letters expressing great interest and practical results from that than anything I did in the way of seed. I think, in the cities particularly, the children did not know anything about it. It appeared to be something that took their fancy right off.

MR. GALLOWAY. One of the most interesting pieces of work in that connection that came to my attention was this: Last spring a gentleman from New York who has been doing this school garden work—he is the principal of a school—has practiced for a number of years giving the boys in different grades experience on a farm

that he has rented for the purpose, and the boys are taken through a regular course. That is, the fourth-grade boys are organized under a city form of government, the next grade is organized under the State form of government, and the highest grade under the national form of government, and this last year about twenty-five of those boys came down to Washington, having made their money themselves on growing their crops. They interviewed the Secretary, and went around to various places, and came through the Department. It was interesting to see these boys, from 12 to 14 years old, with their notebooks, making records of different kinds of seed, trying to get hold of new things to plant on their little plots up there. It is encouraging from the fact that the boys are beginning to think about those things.

The CHAIRMAN. You will turn the drift back from the cities to the country in a few years.

Mr. GALLOWAY. That is what we hope to do.

The CHAIRMAN. Now pass to the experimental farm at Arlington.

Mr. GALLOWAY. The Arlington experimental farm is principally what its name implies; it is a farm where we are conducting various lines of investigation and carrying on various lines of demonstration work. We have now a large orchard, though it is not a model orchard in any respect. By that I mean it is not intended to simply grow fruits, but it represents the principal orchard fruits that we grow in the eastern portion of the United States, and will be a sort of standardizing orchard for other offices of the Bureau.

In connection with the orchard work proper we are carrying on experiments in orchard crops, such as we can carry on in this section and which will be applicable to this section.

In addition to that we conduct all of our tentative forage-crop investigations there, making preliminary tests. We had last year about 40 acres in forage crops—mainly varieties of cowpeas, beans, vetches, and things of that kind, which we are constantly securing and improving.

We have considerable work going on through the other bureaus and divisions. The Forest Reserve is doing work in connection with the osier-willow growing. The entomologists have an orchard all to themselves, where they can turn loose their various bugs and then see whether they can kill them or not. They are also doing considerable work with silk investigations, growing different kinds of mulberries for distribution and for other purposes.

The CHAIRMAN. Is the silk clause under your Bureau.

Mr. GALLOWAY. No, sir; we are only doing the horticultural work connected with it. In other words, we are establishing the problems of the standard collection of fruits of the eastern United States. We are carrying on extensive work in testing varieties of potatoes, some of which have certain importance in being immune to diseases. A lot of this corn work is carried on over there. We have 10 or 15 acres in our test crops of corn.

We have some soil-improvement work being conducted in cooperation with the Bureau of Soils, and we are conducting also over there some investigations—in fact, considerable investigations—in reference to these nitrifying organisms that have been described.

That, in brief, is the work of the Arlington farm. It is really a place where we can go and carry on many lines of work that it is

necessary to carry on before we take them into the extensive field practice.

The CHAIRMAN. Here is a new item:

Horticultural investigations.—For all expenses necessary, including employment of labor in the city of Washington or elsewhere, to enable the Secretary of Agriculture to investigate and report on the growing and handling of crops grown under glass and truck crops, studies of improved methods for cultivating such crops, shipping and handling of the same, and for all necessary supplies, materials, apparatus, and other expenses, \$10,000.

Mr. LAMB. Is that something new?

Mr. GALLOWAY. That is new, sir.

The CHAIRMAN. That is a new recommendation. Let me ask this question: Has not that work all been done in your general work?

Mr. GALLOWAY. Only in a general way. We have not had the men or the facilities to take up these intensive crops as we had hoped and wanted to take them up. The truck crops of this country especially, and the crops grown under glass, are now getting to be very important, and we believe that some special investigations should be carried on with a view to finding out just the proper methods of handling such crops, the methods of handling the soil, and all those questions pertaining to the development of industries which are, to a certain extent, yet in their infancy, but which are of vast importance.

The value of the growing of crops under glass in this country aggregates pretty nearly as much as our tobacco interests. It is a line of work that has not received any attention whatever, with some few exceptions, either from the State experiment stations or from the Department, simply because we have not got around to it.

Mr. SCOTT. It seems to have done pretty well without such help, if it has reached such proportions.

Mr. GALLOWAY. It has done well without any such help, but these men are constantly asking questions that can not be very well answered, because they are questions which can only be worked out by men who are in a position to conduct experiments—questions as to the effect of different methods of handling soils on the crop production, where the product aggregates 50 cents, 75 cents, or a dollar per square foot; the question of certain important diseases to such crops; the improvement of such crops by breeding and careful selection.

The CHAIRMAN. Has not that kind of work all been done?

Mr. LAMB. That is what I was going to ask.

The CHAIRMAN. You have not excluded truck crops from your general investigations?

Mr. GALLOWAY. No; we have not excluded them, but we have taken them up incidentally, and the idea here is to concentrate certain efforts on these crops and study them as we have some of the other crops—tobacco, for example.

The CHAIRMAN. We incorporate the tobacco question in your pathological investigation, do we not?

Mr. GALLOWAY. Yes.

The CHAIRMAN. If the committee desires to allow anything for this kind of work, why can it not be incorporated all in one and not start a new investigation?

Mr. GALLOWAY. It could. We have authority to do almost anything under the words that are in here. There is authority enough somewhere in there.

Mr. LAMB. You have been doing it with tobacco, have you not?

Mr. GALLOWAY. We have been doing it with tobacco, but tobacco does not come within the category of truck crops. We have recently had a great many calls from the truck growers around Norfolk, for instance, to come down and make a study of their special conditions, and tell them what is the reason they used to grow 2,000 lettuce per acre and they have had to abandon lettuce and grow something else.

Mr. LAMB. I can answer that question. It is because they have exhausted the ingredients in the soil.

Mr. GALLOWAY. But they are putting the ingredients back.

Mr. LAMB. They ought to know practically how to put them back, ought they not?

Mr. GALLOWAY. They do not—that is, it is not a question of putting them back, it is a question of getting some rotation of crops, something else that will follow that will be equally profitable.

Mr. LAMB. That is what they are suffering from. I go down there and see the same thing every year on the same acre of ground.

Mr. GALLOWAY. I do not know that it is essential, if the committee sees fit to approve this recommendation, to incorporate those words. In fact, my belief is that the fewer words we have in this sort of thing the better,

Mr. SCOTT. Especially the fewer new words.

Mr. GALLOWAY. Yes; especially the fewer new words. If the chairman and the committee wish to consider it, I would like to ask if it would be improper next year—it is probably too late this year—to consider this whole question of all these miscellaneous things here and try to draft something in a condensed form?

The CHAIRMAN. I was trying to suggest to you that you might redraft all these items.

Mr. GALLOWAY. You would not care to do it for this year, would you?

The CHAIRMAN. Yes. Why not?

Mr. GALLOWAY. We can do it all right.

The CHAIRMAN. It would not take you gentlemen long to eliminate everything that is unnecessary.

Mr. GALLOWAY. It is a sort of crazy quilt as it is now.

The CHAIRMAN. We did that for the Weather Bureau, you know.

Mr. GALLOWAY. The Weather Bureau and the Bureau of Animal Industry and the Forest Service. It would greatly simplify our methods of keeping accounts, for we have to keep accounts with each one of these separate items—not only the paragraph, but an item within a paragraph—and it takes a good deal of extra work bookkeeping.

The CHAIRMAN. I was going to suggest that you make a rearrangement of all these paragraphs and submit it to the subcommittee.

Mr. GALLOWAY. We will be very glad to do that, with your permission.

The CHAIRMAN. Now the tea culture, Doctor. Have you not gotten through with that matter yet?

Mr. GALLOWAY. Was it last year we promised to finish it, Mr. Chairman?

The CHAIRMAN. I do not know but what we will have to cut it right out. That seems to be the only way to get out of it.

Mr. GALLOWAY. I will tell you just what the tea proposition is. Then you can do just what you think best. As I see it, it is largely a question of the people themselves taking hold of the work. We have been quite successful in the tea work at Summerville. There will be about 12,000 pounds grown there this year.

Mr. SCOTT. Let me ask this question: Who will get the price of that tea?

Mr. GALLOWAY. Doctor Sheperd will get the price of it.

Mr. SCOTT. Where does the interest of the United States come in?

Mr. GALLOWAY. The interest of the United States comes in in this way: We have a contract with Doctor Sheperd which gives him the privilege of using the tea. He grows the tea. He is at all expense for all the buildings, the labor and everything connected with the labor, and the teams. The only work we do there is in connection with the development of machinery, which is in an experimental stage. That machinery is the property of the Government and can be withdrawn at any time.

Mr. SCOTT. Do you know what the profit on the crop, if there is any profit, will be this year?

Mr. GALLOWAY. It is very little, because Doctor Sheperd is conducting this work in a somewhat philanthropic way and it is difficult to figure the profit, if there is any profit, because most of the profit he gets from it—

The CHAIRMAN. Do you think that tea raising in this country is, from a commercial point of view, possible?

Mr. GALLOWAY. I think it is. It hinges primarily on labor.

The CHAIRMAN. It is a good deal like the silk question, is it not?

Mr. GALLOWAY. The question that has disturbed us somewhat is the one that has been met with in all lines of agricultural work in the last few years—the increasing price of labor. Unless something is done, not only this sort of industry, but a good many others will either have to quit or be laid aside temporarily. In South Carolina we are fortunate in being able to get cheap labor. We have a tea farm in Texas—

Mr. FIELD. Where is that located?

Mr. GALLOWAY. At Pierce, south of Houston.

The CHAIRMAN. What have you done? Has the Government established a tea farm there? Tell us just what they have done in Texas.

Mr. GALLOWAY. In Texas the owner of the land, Mr. Borden, who has a large plantation, has over a hundred thousand acres he is devoting to miscellaneous farming and cattle growing, and he has set aside 300 acres. He furnishes the land and labor and will put up all the buildings.

The CHAIRMAN. He did?

Mr. GALLOWAY. He will put up the buildings. He furnishes everything of that kind. We have furnished the tea seed and furnished a man to handle the seed and to put out the crop. We have now put out about 50 acres and will begin to pick tea within the next two or three years, at which time Mr. Borden will support the thing.

The CHAIRMAN. How much money have you allotted to Texas?

Mr. GALLOWAY. We have allotted about three-fourths.

The CHAIRMAN. Of the whole sum?

Mr. GALLOWAY. Yes. We only spent about \$2,500 in South Carolina.

Mr. LEVER. Is Doctor Sheperd an employee of the Government?

Mr. GALLOWAY. No, sir; not at all.

The CHAIRMAN. You rather think the Department has got through experiment work in South Carolina?

Mr. GALLOWAY. I do not think it is safe to say that, because we are still developing the quality of our teas. The teas have improved very much in quality in the last two or three years from the fact that we have had our physiologist there. I believe we are making tea there, especially green tea, as good as any that is imported, and better.

The CHAIRMAN. That is a matter of fermentation more than anything else, is it not?

Mr. GALLOWAY. A matter of fermentation and proper machinery for handling, in order to compete with oriental labor.

The CHAIRMAN. Do you think it is possible to compete with that labor?

Mr. GALLOWAY. I believe we can, within certain restrictions. For instance, take the way we make our green tea. Instead of manipulating it all by hand and drying it on copper plates, as the Chinese do it, by hand, Doctor Sheperd has designed a machine through which the green tea passes. It is like a gigantic cannon, about 30 feet long, made of galvanized iron, and as it revolves tea is introduced at one end, and when it comes out at the other end—in about ten minutes—it is cured. We are making green tea of as good quality as any of the Japanese tea.

The CHAIRMAN. Then it is beyond the experimental stage?

Mr. GALLOWAY. That is beyond the experimental stage; but there are certain questions in regard to the finish of teas that we do not understand. It does not add anything to the aroma of the tea, but there is a finish that adds 2 or 3 or 5 or 10 cents to the pound.

Mr. SCOTT. You spoke of being able to get cheap labor in South Carolina. What is the limit that you can pay for labor?

Mr. GALLOWAY. About 70 or 75 cents for full-grown labor; but Doctor Sheperd is handling his labor in this way: He has this large 600 or 700 acre plantation with a fence around it, in which he keeps his families of colored people. The children come up to the tea farm to the house, and he has a school there on the ground that he supports. They are sent to school, and they pick tea, and he pays them so much per pound for plucking. They make from \$2 to \$2.50 a week. The labor is largely in the plucking, and the cost is largely in the plucking.

Mr. SCOTT. Where do you expect to get that labor in Texas?

Mr. FIELD. Mr. Chairman, I would like to state that right in that section quite a number of Japanese have recently come, and they have made a large purchase of land there.

Mr. GALLOWAY. And they are putting out tea?

Mr. FIELD. Whether they are interested in tea culture I can not say. I think their attention is more directed to rice culture.

Mr. GALLOWAY. They are putting out tea, also.

Mr. SCOTT. Do you think it is worth while for this Government to spend very much money trying to develop an industry the success of

which must depend on keeping the price of labor down to 50 or 75 cents a day?

Mr. GALLOWAY. No; but there is a vast amount of labor in the South that is idle—that is not getting anything, practically, during the greater portion of the time—that is, the children.

Mr. SCOTT. It is practically their own will and not enforced idleness.

Mr. LAMB. When children get 75 cents a day, outside of what their parents get—

Mr. SCOTT. But he said for full-grown labor.

Mr. GALLOWAY. We do not get labor for that price in Texas or anywhere else, so far as I know. That is what labor is paid in your section, is it not, Mr. Lever?

Mr. LEVER. Yes; and cheaper than that—60 cents a day.

The CHAIRMAN. And board themselves?

Mr. LEVER. Yes; I think they do.

Mr. GALLOWAY. That is why South Carolina has proved a success in many of these lines of investigation, especially medicinal plants. We can get cheap labor. In the rice lands of South Carolina, where many of the farms have been abandoned from the fact that they can not grow rice, there is evidence that those lands could be turned to practical use in the growing of tea. There is one plantation of 400 or 500 acres now started there, and that will probably be gradually extended; but they have been endeavoring to secure the cooperation of the Department, and we have not seen our way to cooperate with them for the reason that there is nothing experimental in their efforts, because it has been shown that they can grow tea. It has been shown that tea can be properly cured. But we could not enter into any contract whereby the Government could withdraw at any time and take away what it has put in in cash in point of machinery.

Mr. SCOTT. Suppose the committee should think best not to continue this appropriation; could you withdraw on the 1st of July without special loss or embarrassment to the Government or to anybody else?

Mr. GALLOWAY. We could from South Carolina, but we could not from the Texas proposition, because that has not yet been fully put on its feet.

Mr. LEVER. But you would not like to do that, would you?

Mr. GALLOWAY. I would not like to do it now.

Mr. SCOTT. How much would it cost to continue the Texas proposition?

Mr. GALLOWAY. Five or six thousand dollars.

Mr. BROOKS. Is the tea industry such that it could be grown in small plats by a family?

Mr. SCOTT. Yes, sir; that is a problem we have been looking into in the last two years, and we have had one of the graduates of the South Carolina Agricultural College making a study of what he called "home tea growing." We have now in preparation a little farmers' bulletin that describes how to grow the tea and how to make it on the stove.

Mr. BROOKS. That element of child labor that in many cases is not productive at all might be made highly productive in that way.

Mr. GALLOWAY. Possibly.

Mr. LAMB. Are there not in South Carolina already a large number of families making tea?

Mr. GALLOWAY. I do not know that they are making tea.

The CHAIRMAN. I do not think there is any of that yet, is there, Doctor?

Mr. LAMB. I thought that was the purpose of this thing.

Mr. GALLOWAY. There are a number of tea lands all through the South, and while they can grow the plant successfully, they have not taken advantage of the fact that they can make tea at home if they desire to do it. We have samples of home-made tea made by Mr. Mitchell, the young man I referred to, that is of good quality, made with two tin pans on a stove.

The CHAIRMAN. You do not want to abandon that yet?

Mr. GALLOWAY. I wish you would give us another year on it, Mr. Chairman, and we will make our plans accordingly.

Mr. SCOTT. On the whole business, or will you be satisfied to carry on the Texas experiments?

Mr. GALLOWAY. We will be satisfied with whatever the committee does.

Mr. FIELD. Before passing on that, Mr. Chairman, I would like to get more accurate information from the member who represents that district of my State, and who, I am quite sure, is familiar with the work there.

The CHAIRMAN. Very well. Now we go to this wonderful purchase and distribution of valuable seed. I think the committee knows pretty well what the Department is doing along the line of Congressional distribution. What are you doing under that clause where you set aside \$37,000 to be used "to collect, purchase, test, propagate, and distribute rare and valuable seeds, bulbs, trees, shrubs, vines, cuttings, and plants from foreign countries or from our possessions for experiments with reference to their introduction into and cultivation in this country?" That in a way is a duplication of the appropriation for grass and forage plants, under which you are also empowered to bring in foreign grasses.

Mr. GALLOWAY. We are doing all the work in this other field. We have part of the group of men from the grass and forage-plant investigation working directly in this field, and I may say that our introduction and handling of new crops falls within two principal categories: First, the introduction and distribution of fruits and forage crops and, I might say, cereals, and these special lines of investigation are handled by the specialists in other branches of the Bureau. For instance, Mr. Carleton, who looks after the cereal work, looks after the introduction of all new cereals.

Mr. Fairchild, who is one of our explorers, looks after the part of the fruit introductions, and the grass and forage plants are looked after by Professor Piper. We are not only using these funds for the introduction of foreign things, but we are utilizing them for the purpose of propagating and distributing good things we may discover in this country, and we have, I suppose, 25, 30, or 40 different lines of work going on in these directions in different sections of the country, the most important of which might be mentioned just as I have them put down here.

For example, we are introducing and distributing in southern Florida the mango, with the idea of developing the mango industry

in that section of the United States. We can grow mangoes there successfully, and since the Spanish-American war we have had so many of our people visiting these tropical countries that there has developed a taste for the mango and there is a demand for the fruit. There is a greater demand than the market can supply.

Mr. SCOTT. Is the mango successfully shipped any considerable distance?

Mr. GALLOWAY. Yes. It is shipped now from Florida to New York. We have imported from India and a number of the other principal mango-growing regions the finest varieties that we could get hold of. We usually bring them here and they are handled in our greenhouses first. Our expert propagator there, Mr. Oliver, has developed a method for rapidly propagating the new things by what we call "inarching." He gets a seedling and inarches the new varieties on the seedling, which is then sent to Florida.

The mangosteen is a delicious tropical fruit similar to the mango, but when you open it it is more like ice cream, except that it is not quite so sweet, and it can be eaten with a spoon. That is one of the tropical crops we are putting in the South.

An important plant that we have introduced in our propagating and disseminating is a new salad plant called the "udo," something like celery. Another one, a very interesting plant, is known as the "chayote," a kind of a melon that when cooked and sliced tastes very much like the finest English cucumber. We have distributed that very extensively.

The Hanna barley is a barley that is used extensively in Europe. We have grown that in California, and we have it now pretty well established in California.

The European hop we are introducing and disseminating in various sections of this country in cooperation with the hop work I mentioned yesterday.

The pistasche is another fruit we have introduced and are disseminating. The pistasche is a nut used in confections for coloring. It is also used as a pure confection, and has a kernel very much like the almond.

Then the Japanese bamboos; and we are making a special effort to introduce the date in this country. We have established a date garden in Arizona, and we have two in California. We had a cargo of dates last year from the Sahara country. We had a man over there who went right into the region and selected the stock himself, so as to be sure we got the right kinds.

The CHAIRMAN. What success have you had with those dates? It looks to me as if that would be a perfectly feasible thing.

Mr. GALLOWAY. They are now just coming into fruit, and the fruit is just as good as the imported fruit, and some of it is very much better. Take the Deglet Noor date, for instance. It is as different from the date we see in commerce as the finest Baldwin apple is from a crab. There is no comparison at all. It is a date about that long [indicating] and about an inch through, and is transparent, with just one small seed in it, and it is like honey.

The CHAIRMAN. You say that is the date we are raising here?

Mr. GALLOWAY. We have that established in California. It is called the "Deglet Noor."

Mr. BROOKS. How much water does it take to grow it?

Mr. GALLOWAY. It takes very little water. That is, it will grow practically without irrigation. We are growing these dates in the dry sections where no other crop would grow.

Mr. BROOKS. How about the temperature, the altitude, and things of that sort?

Mr. GALLOWAY. It must have, of course, a good deal of heat. Mecca, Cal., if you have been through there, represents the kind of temperature it must have. We have a date orchard at Mecca, Cal., and one near Tucson.

We have also given a good deal of attention to the introduction of a number of important fruits, such as the seedless pomelo, which I described the other day, and which has turned out not to be a seedless one. The Siamese minister said it was about the poorest one in the country. The Siamese minister has started our men on the track of getting other and better products.

Of course it is hardly necessary to refer again to the cereal work—that is, the macaroni wheat work and durum wheat work and other cereals. We are still introducing the newer forage crops.

Those are some of the main lines of investigation and introduction work we have been doing under this particular authority.

Mr. Chairman, I would like to call attention to the work that we do outside of the purely Congressional seed work. It is Congressional distribution, but it is a class of seed that does not come within the category of the garden seeds. One of the kinds of work that we are conducting in that direction is the securing and distribution of high grade and new types of cotton seed that we distribute every year through the southern Members and Senators. To each one we assign about 80 pecks of types of cotton that are new—not introduced cottons, but cottons that some bright man has developed somewhere and that have particular value.

This work has been going on four or five years, and I think it is no exaggeration to say it certainly has had a very marked effect on cotton production in certain sections. We have had many letters from cotton growers who have got started with this seed. We do not distribute the same seed each year. We try to find something new each year, and the corn work is being done in the same way.

We are also doing considerable work with forage crops in the same way. For instance, our alfalfa propagation work is being done out of those funds. A Congressman interested in alfalfa in his section or district writes to us and says he has a constituent who is interested in alfalfa and would like to get a start. We will send him full directions for starting and send him enough seed to get 1 acre going as an object lesson for himself and his neighbors. That work is done through these funds.

It is the same way with tobacco. We have abandoned the old method of simply buying in the open market a lot of miscellaneous seed and giving to each member 150 packages. We are making these special selections of tobacco during the growing season. Then instead of setting aside to each member a certain number of packages we will take it the other way and enter into correspondence with any of his constituents he may refer us to. We believe by doing that, taking these men as actual cooperators, we accomplish a great deal more good.

Mr. CANDLER. You use these special classes of seed for different sections of the country to which they are specially adapted?

Mr. GALLOWAY. Yes. Cotton for the South, alfalfa for the West, vetches for another section, and so on around. We have ten or fifteen different kinds of crops growing, and of these high-bred corns we have enough to go around to a few of those who wish to have corn of this kind introduced into a neighborhood.

The CHAIRMAN. Out of which fund do you say this comes?

Mr. GALLOWAY. It all comes out of the general seed fund—out of the \$290,000.

Mr. BROOKS. Then the whole \$290,000 is not by any means used up in these little packages?

Mr. GALLOWAY. No, sir. It costs about \$5 per thousand packages for the Congressional allotment. We can do it for less than that if we get cheaper seed, but there is a gradient in the seed business. I mean that by certain combinations of seed we could make the seed cost not more than \$2.50 a thousand, but that would be lowering the standard.

Mr. CANDLER. They would not be entirely satisfactory, would they?

Mr. GALLOWAY. No; they would not be entirely satisfactory.

Mr. SCOTT. My experience has been that more of my constituents speak to me in a joking way about the Government seed being worthless than have spoken to me seriously about having obtained new or valuable products for them. I wish, if you could do it without too much trouble, you could put into the record briefly a statement of the precautions you take to secure good seed, and what the sources of your seed are—where the seed is grown.

Mr. GALLOWAY. Do you want me to make that statement now?

Mr. SCOTT. Not necessarily now. I would like to know where the seed is grown and whether it is obtained by contract or otherwise.

The CHAIRMAN. If he can give it to us now, he might as well do it.

Mr. SCOTT. Certainly; if he can do it now.

Mr. GALLOWAY. I can make a statement now; yes.

I want to say that of the 477 members—and I come in contact with nearly all of them in one way or another at some time—this is the first statement of that kind that has been made—that is, that there are more complaints about the worthlessness of the seed than there are about the goodness of it; because I do not see how anyone who took the ordinary precautions with the seed we send out could help from getting results. We send out seed that must necessarily be better than the ordinary seed that the seedsmen can secure.

Mr. SCOTT. Why?

Mr. GALLOWAY. For the reason that we buy our seed in this way: In the first place, a considerable portion of the seed is grown for us out of what we call our own stock. We know the full history of the stock. We get, for example, a pound of lettuce seed of a high quality, and it is true to name. We can take that pound of lettuce seed and turn it over to a reliable man in California and get 100 pounds that is absolutely true to stock, and in order to make it true we send a man into the field where that lettuce seed is grown and have him rove the field—that is, we eliminate all of the lettuce before the seed have gotten away from the desirable characters. We have for that work a man who has had more experience than any other man in the United States—Mr. W. W. Tracy, sr. His special business is to keep track

of our stock. That is the stock we start with. That is done for the greater portion of our seed, and the other we buy out of stock or in the open market under these conditions: We buy to-day, for example, a lot of onion seed. That onion seed, we provide in the contract, must not only be true to name, but must have a certain standard of vitality. It is sent here, and more or less of it is tested in our laboratory, and if it does not come up to our standard it is rejected.

If it is found it is not true to name—and we can only determine that after our field tests are made the following summer—we always withhold a certain amount of pay to cover that; but then during the following summer we make field tests at the Arlington farm and six or seven other places, in cooperation with the experiment stations, of all the seed that enters into the Congressional distribution. We test it for vitality in the laboratory, and we test it for trueness to name in the field.

Mr. SCOTT. Where is your seed grown?

Mr. GALLOWAY. The seed is grown all over the United States.

Mr. SCOTT. Do you make contracts in advance—that is, a year in advance?

Mr. GALLOWAY. We must do that. We are now making provision for the seed for next year. We have to do that in order to be perfectly safe; otherwise we could not secure the seed. We buy all the seed we can in the open market—that is, seed that is now available. We secure it now and have it delivered next August or September; but when it is delivered it must come up to these standards.

Mr. CANDLER. All of them are tested?

Mr. GALLOWAY. All of them are tested.

Mr. CANDLER. Every one when they come in?

Mr. GALLOWAY. When they come in.

Mr. SCOTT. Is it possible to require bids or in any way introduce the element of competition?

Mr. GALLOWAY. Yes; we do that as far as we possibly can. For instance, we want 40,000 pounds of lettuce seed of a certain variety, and we know pretty well the men who can furnish that seed at different places in the Pacific coast region. We send each of those men a blank form, and ask him to submit a proposal for that seed. They come in at a certain time, and unless there is some special reason we will give it to the man whose figures are the lowest, considering freight rates. Very frequently a bid on lettuce seed from, say, Chicago, although it might be a lower bid, would cost us more than if the bid came from some other section, on account of freight rates. We have to consider those things.

Mr. FIELD. Doctor, the common impression is that dealers, such as Landreth and others, destroy all the old stock, so that each year they offer to the public fresh seed. Is that true?

Mr. GALLOWAY. That is one of the fairy stories that go out.

Mr. CANDLER. Landreth does claim he destroys all the seed left over.

Mr. GALLOWAY. I can not speak for any particular firm, but it is the general practice to blend seed. It is not only the general practice to blend seed, but there are all sorts of apparatus and devices that have for their object the rejuvenation of seed—that is, polishing devices that make old seed look bright. There are certain devices that will rub the dust off. There are certain cases where, if they do

not want seed to grow very well (where we get imported seed), they run them over hot plates to destroy some of the vitality. It is an object sometimes to have the seed, especially high-grade seed, low in vitality, the main object being to keep up the price.

The CHAIRMAN. That is why I asked the question about corn. I suppose if you kiln-dried it the heat would destroy some of its vitality.

Mr. FIELD. Are the seed that are not distributed one year by the Government used the next year for distribution?

Mr. GALLOWAY. No, sir.

The CHAIRMAN. How about that, Doctor? How is it about kiln-dried corn? You say in regard to other seed it does destroy vitality.

Mr. GALLOWAY. It is the pushing of the drying up beyond a certain point. If you dry out corn beyond a certain moisture—beyond a certain percentage—you will destroy the vitality; but if you take out some of the excessive moisture you really improve the corn. It will germinate quicker.

The CHAIRMAN. This corn you have here has not been subjected to kiln drying?

Mr. GALLOWAY. No. The only drying this corn has had is what it has received in my office, where it has been for some time.

The CHAIRMAN. Do you think it is a good corn to plant?

Mr. GALLOWAY. Yes, sir.

Mr. HENRY. Is this a hybrid corn?

Mr. GALLOWAY. No; that is the Boone County white.

Mr. HENRY. Do you know how long that takes to mature?

Mr. GALLOWAY. This corn was grown in Ohio. It is not a quick-maturing corn.

Mr. HENRY. One hundred and twenty days?

Mr. GALLOWAY. Something like that. We have quicker maturing corn. I think this corn would mature up in New York.

Mr. CANDLER. You said, a few minutes ago, that the seed left over, if there was any left over, were not sent out the following year.

Mr. GALLOWAY. There has never been any such miraculous happening as any seed being left over.

Mr. CANDLER. Then there is nothing sent out but fresh seed, and those have been thoroughly tested and found to be true to their type?

Mr. GALLOWAY. Yes; and good in vitality.

Mr. CANDLER. So that they ought to be the very best seed that are sent out.

Mr. GALLOWAY. Under the old practices, before the Department got its own seed, it was the custom to run in poor seed. We could not avoid it. For instance, we made a contract with one man to furnish the seed and do all the work connected with the package, and we specified in the contract that he should furnish certain varieties. When he got along in the busy season, such as it is now—putting up three or four hundred thousand packages a day—he would come in with the statement: "We can't furnish the red Valentine bean. We haven't been able to secure it anywhere. Would not some other variety do just as well?" He would say: "I can't get anything but this other variety," and we would have to take it or let the bean drop out.

Mr. CANDLER. What course do you pursue in order to prevent that?

Mr. GALLOWAY. By taking things forehanded we can make provision all along the line. We have right now enough seed for next year's distribution.

Mr. CANDLER. When the seed come in and you test them and find they do not come up to the standard and are not true to type, what course do you pursue in reference to those seed?

Mr. GALLOWAY. The man who agreed to furnish that seed must take them away. That is, we test in part on the sample and then we test when they come in.

Mr. CANDLER. You do not use them at all?

Mr. GALLOWAY. No.

Mr. CANDLER. Is there any penalty in the contract so that you can require him to come up to it?

Mr. GALLOWAY. The only penalty is we do not take the seed. Under the old practices, when the contractor furnished everything, there was a sliding scale of so many dollars for so many points off. If corn only germinated at 90 per cent instead of 98, we dropped off so many cents for each bushel of corn furnished; but we found that impracticable.

Mr. CANDLER. So that now you just absolutely reject the seed?

Mr. GALLOWAY. We are our own masters now.

Mr. CANDLER. Do you reject within certain percentages or do you reject them absolutely if they do not come up to the standard?

Mr. GALLOWAY. We can not fix any definite standard for any particular year. Some years the very best sugar corn we can get will only germinate 60 per cent. That year there is no sugar corn in the country that will go over that, so we take that sugar corn, because that year that might be the standard. One year we had a peculiar case in California, where the hot wind came on when the seed was being harvested and so thickened the skin that the seeds would not germinate at all unless they were soaked. When they came in we could not germinate them. We rejected the whole lot, and then we found that if they were cut or soaked they would germinate all right; but we had to add some special directions to our package, calling attention to this fact.

Mr. CANDLER. You spoke a moment ago about an expert you have in lettuce growing, etc. Has it not been the policy of the Department to improve the experts all along the line?

Mr. GALLOWAY. Yes; we have men now who are as expert as any in the seed business. It is a regular business now.

Mr. CANDLER. You have in the Department the very best experts along this line you can get in the United States, have you?

Mr. GALLOWAY. Yes; we try to get them and try to hold them.

The CHAIRMAN. I notice your increase of \$10,000 is recommended for the purpose of testing new and improved forage crops.

Mr. GALLOWAY. Yes.

The CHAIRMAN. Why would not that more properly come under your grass and forage investigations?

Mr. GALLOWAY. For the reason that we want to retain that grass and forage plant investigation primarily in the direction of this farm-management work rather than grass and forage plants pure and simple.

The CHAIRMAN. Then you gradually change the character of the whole work in that division?

Mr. GALLOWAY. That is what we are working for.

The CHAIRMAN. Under what provision, then, would you do that grass and forage plant investigation?

Mr. GALLOWAY. The absolutely systematic part of it we would leave out and put over with botanical investigations, and the study of the crops themselves could be carried on either in connection with our seed work or in connection with the farm management work, as part of the farm management work, and it would be immaterial where it was put.

The CHAIRMAN. What new and improved forage crops have you in view?

Mr. GALLOWAY. The new and improved crops we hope to devote our attention to are in the direction of these newer crops like the vetches for cover crops, and green manures, and for hay, the extension of the forage work into the dry regions of the West, and what I may call general propaganda work on forage crops, the securing of the cooperation of farmers to make tests and to grow crops under the special direction of the Department, seed to be furnished by the Department, with the advice and such recommendations as the members wish to give in regard to furnishing the names of the men. That is why we put it over in there to use as a part of that fund. That is, it is a part of the Congressional work, but at the same time the purely cooperative features we would look after in the Department after we secure the names of the farmers who are willing to cooperate.

The CHAIRMAN. Last year you used \$10,000 for the erection of a building.

Mr. GALLOWAY. We did not use it.

The CHAIRMAN. This year you ask for \$3,000.

Mr. GALLOWAY. We did not use that money last year. We simply turned that back into the seed work and used it for seed.

The CHAIRMAN. It reads here: "That \$3,000 of the sum thus appropriated, or so much thereof as may be necessary, may be used for the erection of necessary buildings."

Mr. GALLOWAY. That is rent, is it not, Mr. Chairman?

The CHAIRMAN. It says "erection."

Mr. WOODS. I think that refers to the testing gardens in California. This is under foreign seed.

Mr. GALLOWAY. That \$3,000 is a different thing.

The CHAIRMAN. It is in the last clause in that paragraph at the top of page 21.

Mr. GALLOWAY. This new item of \$3,000 is for the erection of the building in connection with our testing gardens in California, at Chico, Cal.

The CHAIRMAN. You are doing a good deal for California, are you not? These other States will get envious.

Mr. GALLOWAY. We have at Chico secured, through the cooperation of the people of the State and the State experiment station, 80 acres of land, where we grow many of these new introductions that we are bringing in. Now, we have out there two or three men. The Entomologist has a man out there making special investigations of bee culture for the Pacific coast, and we want some sort of a building to house those men, in which they can work on the grounds. Here-

tofore we have been working more or less in makeshifts and have had nothing on the ground. We did not intend to use any of the \$10,000 for that purpose, but simply \$3,000 that we could save in some other way.

The CHAIRMAN. What did you do with the \$10,000 last year?

Mr. GALLOWAY. We turned it into seeds.

The CHAIRMAN. How did you get along without this building? I remember you urged that you needed it.

Mr. GALLOWAY. We got the building through renting.

The CHAIRMAN. Now, we come to that sugar business, at the bottom of page 21. That is another proposition that I am inclined to think is about ended.

Mr. GALLOWAY. There are certain features of that sugar business to which I desire to call attention. We are using \$4,000 of that fund for what I consider perfectly legitimate and proper work, for the reason that it has for its object the growing of the single-ball beet seeds. Then in addition to that we are devoting a part of that money, and a part of the money we get from the seed fund, three or four thousand dollars, to the encouragement of sugar-beet seed growing in this country. We believe that is vital. We have now encouraging results from all sources. There is about \$5,000 that is used by the Secretary.

Mr. BROOKS. How much do we pay annually for sugar beet seed to Germany?

Mr. GALLOWAY. About \$5,000. - It is not so much what we pay, Mr. Chairman, as the fact that we are absolutely dependent on foreign nations for the very basis of work in sugar-beet culture.

The CHAIRMAN. The fact is, the important thing in sugar-beet production is the labor problem.

Mr. GALLOWAY. If we can increase the sugar content, as it unquestionably can be increased, we are gaining all the time. We have beets that have run as high as 25 per cent. The average, I think, is about 11 per cent.

Mr. BROOKS. Tell me why it is the average is so low? In our State this year just closing the average was only about 10½ per cent right through.

Mr. GALLOWAY. It is because you depend on this foreign seed.

The CHAIRMAN. What is the percentage in Germany?

Mr. GALLOWAY. The percentage in Germany is a little higher. It is 12 or 14 per cent. But we do not get the best seed. Naturally they will hold back the best seed.

Mr. BROOKS. I have seen load after load of sugar settled for on the basis of a saccharine content of 20 per cent. Of course there must be a great deal of it that is very low indeed, but I have stood at the sugar factories and have seen them bring their wagons in and get their tests at 18, 19, 20, and 21 per cent. The highest I ever saw was 21½, or something of that sort.

Mr. GALLOWAY. We are distributing eight or ten thousand pounds of the American-grown seed every year and putting it alongside of the foreign-grown seed to serve as demonstrations of the fact that we can grow in this country just as good seed as the foreigners send us.

Mr. BROOKS. The increase of a single per cent in sugar content in Colorado would have meant, I think, \$1,000,000 this year.

Mr. WOODS. May I add a word there? It has not been reported to Doctor Galloway yet, and that is the reason I mention it. Our sugar men found that there is just as much variation in individual beets in a field as there is in the tobacco plants. By careful seed selection you can breed from strains of high sugar-producing power to a very much greater extent than is now practiced, either in Europe or in this country.

Mr. BROOKS. Instead of cutting that appropriation, I think it ought to be increased, because if the sugar-beet industry is going to live in this country—

The CHAIRMAN. The breeding of the seed is most important, I think.

Mr. GALLOWAY. How much, Mr. Woods, are we devoting to the sugar-beet work? Mr. Chairman, we have a sugar-beet line of investigation in pathology and physiology under Mr. Woods. Mr. Townsend is studying that work. He is devoting his attention to the seed work. He is also giving considerable study to the effect of fertilizers on tonnage, and questions of that kind.

Mr. WOODS. We are devoting, in my office, about \$6,000, and then about \$2,000 from this fund—\$8,000 for the sugar-beet work in pathology and physiology, and from the seed fund about \$4,000 for the seed-selection work, making about \$12,000 altogether, exclusive of the portion that goes to Mr. Saylor for gathering sugar-beet statistics.

The CHAIRMAN. You said the Secretary was using \$5,000 of this. Is that for special work?

Mr. GALLOWAY. Mr. Saylor is under his special instructions.

The CHAIRMAN. What work is he doing?

Mr. GALLOWAY. He is gathering statistical data each year in reference to sugar-beet culture. He publishes an annual report giving an account of the sugar-beet work, calling attention to methods adopted in improving the conditions in the sugar-beet regions. That is the main line of work he is carrying on.

The CHAIRMAN. That \$5,000 just includes salary and traveling expenses?

Mr. GALLOWAY. Yes, sir; it includes his salary and all other expenses.

The CHAIRMAN. That closes up your Bureau, Doctor, unless you have something to add, and I want to ask you one or two questions.

Mr. GALLOWAY. I have here a memorandum in regard to the percentage of sugar in our beets of last year at Fairfield, Wash. It runs from 18 to 23 per cent of our mother beets. We had 9 roots which tested 24 per cent, 50 roots which tested 23 per cent, 100 roots which tested 22 per cent, 191 roots which tested 21 per cent, and 187 roots which tested 20 per cent. These roots form the mother roots that will be put out this next year, and seed taken from those mother roots are tested again.

Mr. BROOKS. That is in the State of Washington?

Mr. GALLOWAY. In the State of Washington.

Mr. BROOKS. You stated the other day you were carrying on part of this in Colorado.

Mr. WOODS. That is the single-germ work.

Mr. GALLOWAY. We have a table here showing comparison tests of American seed with European seed from different sources, showing

the sugar content in both cases. In all cases the American seed is shown to have the higher sugar content.

The CHAIRMAN. What men has the Bureau traveling now in the interest of the Bureau? Have you any men abroad at the present time?

Mr. GALLOWAY. We have one explorer abroad, now in China.

The CHAIRMAN. What line of work is he doing?

Mr. GALLOWAY. We sent him over there to get new roots, new seed, and new plants from a region that has never before been visited by explorers and, so far as we know, by white men. He is going back of Peking, up in the mountain sections. He was up there last fall, and he is sending in records of many interesting things he has found. The plants and seeds and cuttings will come in in the next two or three weeks.

The CHAIRMAN. Is he treated in a friendly way?

Mr. GALLOWAY. Yes. He is a genius in the matter of getting around. He is a Hollander, but he is a man who does not bother about red-tape. He simply takes his little pack on his back and goes right out over the country and makes out the best way he can. He is finding a number of interesting things in the way of new fruits—new grapes, new persimmons, new plums, new peaches especially. This winter he got through one year of his work. He is going up the Yangtze country, to the headwaters, and live there about two years. Next summer he will go over into Manchuria, where there are a number of interesting things.

The CHAIRMAN. Is he the only man you have out?

Mr. GALLOWAY. He is the only man we have out now.

The CHAIRMAN. What men did you have out during the year?

Mr. GALLOWAY. We had out a special explorer in Africa.

The CHAIRMAN. What was he doing?

Mr. GALLOWAY. He was seeking for new dates and new dry-land crops. Did we have out any fruit man but Kearney during the year, Mr. Woods? I think not.

Mr. WOODS. Did not somebody go out and get some clovers?

Mr. GALLOWAY. Yes; we had two men who went up into Norway and Sweden in search of northern clovers that we could introduce into the Northwest; but their trips were short. We have found that we have been introducing faster than we could place things, and we have held up on our introductions until we could get a lot of the things we have now on hand better established, believing it would be wiser to follow that practice. In connection with our grain work, we have got the durum wheats growing so well that that work, in a certain way, can be turned over to other assistants, and Mr. Kearney can probably make other trips in other parts of Russia to get certain things he got track of when he was there before.

The CHAIRMAN. Your remark leads me to make the statement, as I have said before, that your Department is well in advance of the needs of the country all the time. Have you any men traveling through the United States on special work now, seeking for any new thing?

Mr. GALLOWAY. Practically all of our men are in the field a considerable portion of the time. Take our cotton work. Doctor Webber and his assistants, who are doing cotton-breeding work, are constantly on the lookout in the South for particular varieties that the

farmers themselves have developed. If they find a farmer has developed a particular variety, they make arrangements with that man to grow 40 or 50 or 100 or 200 bushels of that cotton for the next year. It is the same way with our fruit work. We have three men this winter working on this question of fruit shipment and fruit harvesting in South Carolina. Our grain and cereal men are in the field constantly. About the only time the majority of our men are in Washington is in the winter, when they come to Washington to finish up reports and make preparations for the coming year.

The CHAIRMAN. Now follows the item for—

Special cotton investigations.—To enable the Secretary of Agriculture to meet the emergency caused by the spread of the Mexican cotton-boll weevil in the Southern States by encouraging the diversification of crops, improved cultural methods, breeding of new cottons, and to study the diseases of cotton, \$105,500, or so much thereof as may be necessary. And the Secretary of Agriculture is hereby authorized to expend said appropriation in such manner as he shall deem best, in cooperation with the State experiment stations and practical cotton growers.

Last year we gave you \$190,000.

Mr. GALLOWAY. That work was divided between the two bureaus, the Bureau of Entomology and the Bureau of Plant Industry, and the Bureau of Plant Industry assumed the work connected with the crops proper and the Bureau of Entomology the work connected with the study of the insects. We have divided the thing this year, because the field is now well defined and the work there is the same we used last year. It authorizes the Department to conduct investigations in the diversification of crops, the demonstration of new methods, the improvement of the cotton by breeding and selection to meet the new conditions, and the study of diseases.

Mr. LAMB. How is the boll weevil getting along?

Mr. GALLOWAY. He is still making progress.

Mr. LAMB. Has he got this side of the river?

Mr. GALLOWAY. Oh, yes; he is over in Louisiana now.

Mr. LAMB. What is your Guatemalan ant doing for him?

Mr. GALLOWAY. The ant has not done very much as yet. We have not had enough of them in to produce much effect. Mr. Chairman, do you care to have me briefly run over the lines of work we have been conducting under this cotton?

The CHAIRMAN. Yes; if you please.

Mr. FIELD. In that connection, when Doctor Galloway has finished Doctor Knapp is here and is quite familiar with that work.

Mr. GALLOWAY. Yes. I did not know Doctor Knapp had come in. Mr. Chairman, we have been conducting, first, I may say, investigations and experiments having for their object the securing of types of cotton which would be prolific and which would be early maturing, so as to secure the full crop before the advent of the weevil. When the weevil first invaded Texas, it was found that early maturing crops were necessary. Now, these early maturing types, unfortunately, are not very good yielders. Our breeding work has had for its object mainly the securing of types of cotton which would be as good yielders as those formerly grown in the cotton-boll section and at the same time be early. We have already secured two or three varieties that are very promising in that direction and are preparing to distribute some of the seeds of those varieties this coming year.

The breeding work is comparatively slow work. We have done most of that work necessarily right in the boll-weevil section of Texas, with our headquarters last year at Dallas. The year before we had our headquarters at Terrell, but moved to the other place because we had better facilities for carrying on investigations.

We have had in this connection varieties of cotton not only from all the Southern States, but from all over the world, where we can test them and get a basis for our work on breeding them by hybridization—that is, cross varieties—with the object of crossing these new types, and also in the work of crossing straight varieties. We have in this connection utilized varieties that have been brought in from Central America, where cotton growing has been practiced for ages, and where, under the boll-weevil conditions, entirely new adaptations have been worked out of the cotton itself, adaptations which, if they can be utilized in connection with our breeding work, may prove very valuable. Certain cottons of South America have had adaptations which served to destroy the larvæ of the weevil when the egg is placed in the square, and that has been developed to quite a high extent in a number of types.

In connection with this work generally, we have carried on investigations in general farm management and demonstration work, which has been under the direction of Professor Spillman. This work has had for its main object the encouragement of diversification, and encouragement of diversification by general propaganda work and general demonstration where we could select different farmers in different regions to undertake the work in cooperation with the Department. We have now something like 30 or 40 of these demonstration farms where diversified agriculture is being practiced, and where it is being practiced in a way that will show the possibility of still growing cotton and increasing the yield, diminishing the acreage and also producing other crops as well. I briefly referred to that this morning in connection with the grass and forage plant work which Professor Stone is carrying on.

On the diseased work we have been making special studies of the root rot of cotton, which in some regions is as severe as the cotton-boll weevil. The efforts in that direction have been toward the breeding of resistant types and the testing of various materials on the crop itself.

In regard to the propaganda work in Texas, I will, with your permission, ask Doctor Knapp, who is here with us and who has been in general charge of the work for the last two or three years, to briefly give the committee the results of his work down there, and tell just how we have gone about reaching the real farmer, who is the man directly involved in this proposition. With your permission Doctor Knapp will address you.

The CHAIRMAN. We will be glad to hear Doctor Knapp.

STATEMENT OF S. A. KNAPP, OF LAKE CHARLES, LA.

Mr. KNAPP. Mr. Chairman and gentlemen of the committee, the real work that I am in charge of is how to make the work of the Department more effective for the people. In other words, Doctor Galloway and I worked some years on this proposition: While the

Department is doing a good deal of work, the people are not following as rapidly and taking hold of it and making it practical as rapidly as they ought; how can the people be reached so as to take hold and adopt these better methods?

While we were at that and had commenced on a series of demonstrations to prove how and why, this boll-weevil matter came up. An emergency existed, and whole communities, as at least one of the members of your committee is aware, became very much demoralized. As cotton was the sole cash crop, if they could not make cotton, that ended agriculture, because at that time those people made their crops almost entirely on what we call the advance system. They borrowed the money, or rather arranged for it to be given to them periodically or otherwise by their country merchant and banker, and then when they made their crop if they had enough to repay it, they did so; if not, their farm became mortgaged to that extent.

The sole basis of their credit was cotton. They would get no advances on anything but cotton. Therefore if they could not make cotton on account of the boll weevil, credit was at an end and they must immediately abandon their farms, and they were abandoning them. The merchant was broken in many cases, and in some cases even the banker went to the wall. Then there was a cry of emergency, and in that emergency this plan was devised by the Bureau of Plant Industry, that some one well acquainted with the South, who could perhaps influence them, should go and tell them how to make a crop. It was conceived that no gift to them could be of any great or lasting importance, but if they could be shown how to make a crop, it was a solution of the problem.

The CHAIRMAN. You mean make a crop in spite of the boll weevil?

Mr. KNAPP. In spite of the boll weevil; yes, sir; and it was claimed by the investigations of the Bureau of Entomology that that could be done.

Furthermore, in traveling through the South a great deal I had secured the names of a good many farmers who had successfully made a crop despite the boll weevil.

The CHAIRMAN. That was in Texas?

Mr. KNAPP. In Texas at that time, but since in Louisiana, because it (the boll weevil) is now nearly across the State of Louisiana. It is within about 40 miles of the Mississippi River. It is in the Red River Valley.

We organized this plan. I was given pretty considerable latitude because it was so far removed and we must act quickly. The appropriation passed, I think, about the 27th of January, and by the 1st of March we had our local organization complete in the field and had secured the names of nearly 8,000 farmers in Texas and 250 in Louisiana who would follow our instructions as to how to make a crop despite the boll weevil. The plan was to have these agents make a personal appeal to the merchants and the bankers first, so as to get at the sources of the money supply, as they must advance to these people; secondly, to appeal to the general farmers and show that a crop could be made. That would restore confidence. We went to communities where they had refused to loan. We restored confidence and secured the necessary loans. Then we appealed to the people to try to make a crop by using less money—that is, to carry some-

thing with them every time they went to town, to raise their own fruits and vegetables and Irish potatoes and truck, anything to get a little money to pay current expenses—so that their cotton crop, or cash crop, would be a clear gain.

To an amazing extent they followed our instructions, and such was the interest that in some places I was able to visit I have frequently had 1,000 farmers most attentive listeners. They would ask a great many questions and endeavor to follow as far as they could.

We did restore public confidence that a crop could be made. The first year was 1904, and 1904 was quite a favorable year for cotton, and one of the largest crops ever made in Texas was made despite the boll weevil. The same plan was followed in 1905.

I should have stated, however, in regard to the 8,000 farmers who agreed to follow our instructions, these men were scattered so that they could have a demonstration, as I stated to them, at nearly every cross-roads, not taking a great many acres, but just a few acres. We said to them: "This is not a method devised in Washington. It is the experience of the best farmers of the world in raising cotton which we wish you to take. They sometimes call them 'cultural methods,' but it is really the best farming of the world, so far as we know. Now, try 2 or 3 acres. You ought to try it anyway, as you are a good, progressive man, and see what will be the result as compared with your ordinary methods. Even if you have not the boll weevil, it is just as good for you. It will increase your crop from 100 to 500 per cent according to circumstances and according to the care you take. Therefore you should adopt it." And they did adopt it.

As I said, about 8,000 enrolled themselves and agreed to report. We addressed them every month. We gave them instructions. We kept a perfect journal of their conditions—a farm book—just as if the farm belonged to us; and every month one of our agents called on them to see if they were living up to the instructions.

In addition, as near as we could estimate, about 50,000 farmers followed instructions. The others called them Government farmers. Yet, if Mr. Jones agreed to follow Government instructions, Mr. Smith would quietly say: "I can beat Jones," and he found that he could beat him in any way except by getting out instructions, or he would get some one, or send himself, and get the instructions, and before the year was out he would say: "Well, I have been following your plans. I might as well report."

The CHAIRMAN. These instructions were in printed form?

Mr. KNAPP. In printed form; yes.

The CHAIRMAN. Do you mail them generally all over the State?

Mr. KNAPP. Yes, sir.

The CHAIRMAN. Without being asked for them?

Mr. KNAPP. No.

The CHAIRMAN. Only to those who ask for them?

Mr. KNAPP. We mailed to those who asked for them, and, in most cases, they were printed in the local papers.

The CHAIRMAN. They got into general circulation?

Mr. KNAPP. Oh, yes. To show the extent to which they were used. I will state that we used 120,000 envelopes that year.

The CHAIRMAN. That is the first year?

Mr. KNAPP. The first year—1904.

The CHAIRMAN. What was the result in 1905?

Mr. KNAPP. In 1905 the result in some sections was less apparent, because it was a very bad year.

The CHAIRMAN. A wet year?

Mr. KNAPP. Yes; and it was impossible to follow our instructions, because our instructions were to cultivate a little during the winter, so as to get the soil in proper condition, and plant early. They could not plant early, as Mr. Field very well knows, in most cases. It was impossible to plant early. It was so wet in northern Louisiana that for three weeks most of the farms would take a horse to the knees if he stepped in one of those fields. They could not get into the fields; but they carried it out just as well as they could, and the reports showed that on sandy, rolling land, where they could get on the fields, they generally made a better crop in 1905 than they did in 1904.

In western Texas they made better crops, because, as it was a wet year, they had more rain. Take the thirty counties centering at San Antonio. They had formerly plowed their land in the fall. The report to me was that 15 per cent of the farmers had plowed their land. That is necessary, in order to destroy the cotton stalks in the fall to prevent the hibernation of the weevil. The first year such influences were brought to bear by us that in the fall of 1904, 65 per cent was plowed. As the result of that better preparation, and the killing of more weevils, and poorer hibernating conditions for the weevils, and various other causes, they made about the best cotton they have made in many years out in that country.

The CHAIRMAN. This year?

Mr. KNAPP. This year.

The CHAIRMAN. In western Texas?

Mr. KNAPP. Yes; western Texas. That means that great country clear down to the Gulf.

Mr. HASKINS. Do they not burn the stalks?

Mr. KNAPP. They ought to—that is, where the boll weevil exists they ought to. They ought to destroy them, because a great many eggs are in the stalks.

Mr. HASKINS. I so understand.

Mr. KNAPP. Yes; they ought to burn them; and they did burn and destroy them, and so they made a great crop. In fact, the weevil did not seem to trouble them very much. Then it continued up until along in central Texas, in the sandy loam uplands, they prospered, from our report, better than ever.

The CHAIRMAN. This year?

Mr. KNAPP. Yes, sir; this past year. On the black lands, which are very wet when they are wet and are great cotton lands, they did not do as well this year as usual.

The CHAIRMAN. Due to the boll weevil?

Mr. KNAPP. No; not due to the boll weevil. They generally prepared their lands all right and destroyed the weevil in the fall.

The CHAIRMAN. Then the deterioration of the crop was not due to the boll weevil?

Mr. KNAPP. No; it was not due to the boll weevil. It was due to the fact that they could not carry out good methods. Then in Louisiana they had overflows on the Red River, and everywhere it was one of the most disastrous years, and yet, while the average of Louisiana

had been about 400 pounds of seed cotton per acre, the average of the whole State for this past year, as shown by the report of the State crop reporters, which I looked at——

The CHAIRMAN. How many bales is that? About three-quarters of a bale, is it not?

Mr. KNAPP. No; it takes about 1,400 or 1,500 pounds. It lints on an average one-third, so 1,500 pounds would make 500 pounds to a bale. It lints about a third. I am glad you raised that question.

Now, out of a large number of our cooperators who reported we had a great many who exceeded a bale to the acre—that is, they made, say, 1,500 pounds instead of the average, and they all reported that they succeeded better than their neighbors by some 25 to 100 per cent—that is, those who followed our methods succeeded better than their neighbors who followed their own plan. Part of that is due to the fact that we insist on prompt and thorough farming, and if they reported to us and kept it up they became better farmers. That is all there was of it.

The CHAIRMAN. Is the Government carrying on any of these experiments itself? Is it doing the work?

Mr. KNAPP. No; we are not doing any work.

The CHAIRMAN. It is only done under your supervision?

Mr. KNAPP. Under me. We take the ground that when you reach the farmer it is better for him to do it, and he feels more satisfied from the fact that he works it out himself than if we did it and he looked on. The man does not really adopt it until he does it himself. We do not give him anything. We simply say, "Here are the facts." It has had such an effect that we have had no trouble.

The CHAIRMAN. You have practically established that by improved cultural methods you could raise a crop of cotton in spite of the boll weevil?

Mr. KNAPP. Yes, sir.

The CHAIRMAN. Now, what further steps are you going to take along that line, after you have demonstrated that fact pretty freely?

Mr. KNAPP. We are moving up with the boll weevil. You see, they do not adopt these things by reading about them. They only adopt them as we go to them. Those people there are pretty conservative, and so we are simply moving up with the boll weevil.

The CHAIRMAN. Did the experiment station of Texas give you any aid at all?

Mr. KNAPP. No, sir.

The CHAIRMAN. Did it in Louisiana?

Mr. KNAPP. No; we rather have to help them, in this way: In order to have every agricultural board in perfect harmony, I arranged with the agricultural college so that the station shall harmonize with our work and we harmonize with the station, and when they send out one of their men I try to have him one of our reporters or cooperators, so that we work together.

The CHAIRMAN. It is probable the boll weevil will cross the Mississippi sooner or later.

Mr. KNAPP. It will probably cross it this year.

The CHAIRMAN. Why is it not a good plan for all the experiment stations of these cotton States to take this matter up now before it reaches them and try to induce people to change their cultural

methods and be ready to meet the emergency and make less dangerous the effect of the boll weevil?

Mr. KNAPP. That is a very wise suggestion. We have a man now in Mississippi trying to do that very thing in advance, because they stampeded with fright. As soon as the boll weevil appeared a man dropped everything and left. He did not want anything more to do with farming.

The CHAIRMAN. We had the same thing in our country when the weevil attacked the wheat. It was the same thing exactly.

Mr. KNAPP. If you go on in advance and get a man to understand how to control the weevil and make a crop, he does not fear it so much any more.

The CHAIRMAN. The only question is whether you can make people appreciate the danger until they are right face to face with it.

Mr. KNAPP. To a certain extent you can. We have to do it in this way. If we were to send men from Washington, the farmers would not pay much attention. We take men who are the progressive farmers. We aim to get the best farmers in their own section, men whom their neighbors believe in, and they will listen to them pretty generally. Then we have no trouble.

Now, we have another class of farms. There are about 300 special farms in Mississippi, western Tennessee, Arkansas, Louisiana, Texas, and one or two in the Territories in the region which will pretty soon be reached by the weevil. It has been a general point with the co-operators to limit the farmer to a few things. The three things to which we practically limit him are cotton, corn, and cowpeas, because those are the basis of southern farming, the corn for his stock, the cowpeas for renovating his land—and hosts of them never paid any attention to renovation—and the cotton for the cash crop. We tell them some things about diversification, but we teach those three things.

On these special farms we take half a dozen of the best varieties of cotton and see which is the best adapted to that particular section, because we find that a cotton that may be of the very highest qualities in North Carolina, South Carolina, and Georgia does not work the same way in Texas or Louisiana or Mississippi, so we must adapt the cottons to the soil and to the climate. Texas has about as many climates as the whole United States put together. It is from wet to dry, and there are all sorts of conditions.

Now, these special farmers adapt the cotton and adapt the corn and their crops to show what are the best as a sample. We sent into one section of Texas about 100 bushels of a very improved variety of cotton—improved in Texas, and excellent for uplands, with a long staple, large boll, and with all the good qualities. It was also very early. We instruct the men to keep tab of the cost. We try to make every man a bookkeeper on his farm, so that he knows what he is doing. That is one difficulty with southern farming. By keeping track of the production we found that that variety increased the yield from 75 to 250 per cent above ordinary cotton cultivated or treated exactly the same way and on precisely similar soil contiguous to it.

Again and again we tried that, and such was the excitement that in one place where we distributed six bushels the merchants would go out and cut cotton stalks and hang them up in the stores, so that every

man could see and discuss the methods of treatment, and everything, and that one station purchased 3,000 bushels of that variety of seed, besides saving all the seed they had. That shows their belief in it.

Furthermore, I know one flag station on the Texas Central that up to three years ago never shipped a hog. This year they have shipped somewhere between 150 and 200 carloads of hogs, besides raising their own pork.

We have advised them to go into the production of chickens and turkeys. One firm, established since we commenced our work, in the city of Houston last fall dressed 6,000 turkeys per day and shipped them to northern cities.

The CHAIRMAN. Six thousand per day?

Mr. KNAPP. Six thousand per day; yes, sir. A flock of 300 to 500 turkeys is now a rather common thing along some of those sandy uplands where there is plenty of oak grove, and so on. In other words, they have learned that they can make a living out of something and make some money out of other things than cotton. In other words, the earning capacity of the average cotton laborer was so low that there was no use to talk about high civilization for him. We had to get at the bottom of the matter and increase their earning capacity. Then they want schools, and they want everything that anybody else has. No class of people in the world are more ready to learn than the poor whites of the South, and many of the negroes. They listen and they are attentive, and it is possible to change their whole condition. Instead of their being poor forever and living along in a half sort of way, they can be among the best farmers of this whole country. They have the opportunities in the soil and climate, if they only know how to take advantage of them.

We did not depend on guesswork. At the close of the first year we took the statistics of the banks—"What are your loans and what are your deposits in former years?" We took the statistics of the merchants—"What is your trade this fall of 1904 as compared with former years?" We took the statistics of the railroads—"How much cotton have you shipped from these points along your lines of road?" I have them all filed away in my office at home. "How much cotton have you been shipping? What did you ship before the boll weevil? What has been the falling off from year to year? What have you shipped this year?" Then we brought all those facts together as positive proof of the immediate relief and of the fact that the few thousand dollars we spent there meant millions to the people.

The CHAIRMAN. That is due entirely to good cultural methods?

Mr. KNAPP. To good cultural methods.

The CHAIRMAN. You have done nothing except to advise them to improve their cultural methods?

Mr. KNAPP. Advise them and keep after them and create public sentiment.

The CHAIRMAN. What work were you engaged in in the Department before you undertook this business?

Mr. KNAPP. Mr. Secretary Wilson is an old friend of mine and asked me to help him about southern matters. He and I used to belong to the same propaganda in Iowa, and if one belonged to an association the other generally did. He asked me to come up here. He said: "I don't know anything about the South. Now, tell me

about it. I want to help those people." So I have been engaged in a lot of things. We found a section of country about 700 miles long and extending inward from the Gulf about 60 miles on an average—a prairie country, and a great deal of it that would not produce, as they thought, anything but grass. That land was worth twenty years ago from 25 cents to \$1 or a dollar and a half an acre possibly in some places. I took two years to investigate that and finally said to them: "We must either find a plant that likes this condition or else we must change the condition. It is a question of drainage. The subsoil is too stiff." We concluded to take the plant. We selected rice. Rice was made there by hand, the same as cabbages are planted all over the world pretty nearly, excepting in the Carolinas, and there it is largely a hand process. They reap it with the sickle. We wanted to adapt northern methods to rice.

We did so, and as a result what was considered the most worthless country on the face of the earth—a country about which one of our most distinguished Senators said to me he would hold me personally responsible for bringing men from the Northwest to starve to death—is now one of the most prosperous sections in the whole world.

The CHAIRMAN. Rice?

Mr. KNAPP. Rice. That industry has grown from nothing to represent \$100,000,000. I hope it will go on. That is one of the things.

The CHAIRMAN. We are actually exporters of rice, are we not?

Mr. KNAPP. No, sir; not yet. They call it exporting. In 1894 and 1895 we did export a lot of rice, but it was due to conditions which it would take too long to explain—overcropping, and one thing and another—and we brought our men together under the Rice Association of America, of which I am president, and we concluded we had better lose a dollar a barrel and reduce our crop here, and we made a sacrifice and did export. We can not export under present conditions, but it is due to the fact that our people do not really know how to grow rice. They know how to grow wheat, but there is something in the growing of rice which 99½ per cent of men engaged in it do not know much about. The average crop of Louisiana runs about from 7½ to 8 barrels, and of Texas perhaps from 8 to 10 barrels per acre. A barrel is 162 pounds; 3½ bushels. They have that measurement there, calling it "barrels."

But a Japanese lawyer, formerly a member of the Imperial Parliament, representing the old city of Kioto, brought letters to me, and the Japanese Government wrote me through their consul asking me to befriend one of their countrymen. He located at Webster, just below Houston, two years ago, and he knew how to grow rice. His yield the first year was 32 barrels per acre, and this last year, though a very bad year for rice—and he planted some Honduras rice that does not yield as much as the Japanese rice—his entire farm yielded 22 barrels to the acre.

The CHAIRMAN. How many acres?

Mr. KNAPP. He had 150 the first year and 225 in 1905. He sold that product very high for seed, because it was of fine quality. He paid for his land \$27 an acre. His improvements on the 225 acres—putting on machinery, putting down artesian wells—cost \$5,000. Then his teams and tools cost him about \$1,000. He brought over his Japanese wife and Japanese boy, and they all put on working clothes and went into the fields except the wife. She worked in the

house. He cleared that farm and laid up from twelve to fifteen thousand dollars in two years. That shows what we can do if we know how to grow rice.

But our people came down from the Northwest largely and thought they had a bonanza. They would not raise their own food supply. They bought everything. They went into it in an extravagant way. They bought hay for their horses and grain from the Northwest and attempted to pay for it out of rice. Then, they did not know how to raise large crops, and the result has not been as prosperous as they expected, but it is very spotty. One man has been very prosperous and another man has not been very prosperous, but we are hoping. As a whole, it is prosperous.

The CHAIRMAN. Do you make your headquarters down in that country?

Mr. KNAPP. I have lived there for twenty years; yes, sir. I knew the people personally through those States before I commenced this work. Then, we had some rice troubles, and I traveled abroad in the interest of the Department to get the kind of rice that would not break so in milling, and we got it. We wanted a rice also the straw of which would be good, and we found it where it ripened from the top, and the straw was green when we cut it.

The CHAIRMAN. So that the straw would serve as forage?

Mr. KNAPP. As fine forage; yes, sir. Now we are making a second step. In the sugar business, with our centrifugals, we have a molasses worth about 3 cents a gallon. All but about half or three-quarters of 1 per cent of the saccharine matter is taken out. Still it has a good flavor and there is a good deal of nutritive value in it. We take alfalfa, which has an excess of protein, and rice straw, which is a little deficient in protein and in flavor, grind them up together and put in this poor molasses and it makes a fine fodder, so that, excepting the alfalfa, it is using up the waste products. That, if carried out extensively, will mean a saving of millions. In other words, we make enough out of our straw to raise the crop. We are now burning that straw, a ton and a half to the acre. So that the losses and the extravagance amount to a good deal.

The CHAIRMAN. Is there no good result from plowing that straw under?

Mr. KNAPP. Yes; it is all very helpful to plow under, but their lands are virgin and so rich that it would mainly, in plowing it under, grow straw. It would not increase the grain crop much. On some of those farms you almost need a ladder to get to the top of the straw. On Mr. Borden's farm in Texas he planted Honduras and it grew 8 feet high, so we have had to select a kind of rice that grew short straw.

The CHAIRMAN. Is it a healthy country to live in?

Mr. KNAPP. Yes, sir.

The CHAIRMAN. Any malaria, or that sort of thing?

Mr. KNAPP. No; not to amount to anything. It is swept by the breezes from the Gulf, which are pure, because water is a great absorbent of malaria. Those breezes come absolutely pure and sweep over that land. Then the land is not marshy, and as long as those rice fields are well covered with water they absorb malaria. The difficulty would be after the water is taken off. It is the dry swamp that is the trouble. When you take water off the Mississippi bottoms, that

land is spongy a good many feet down and remains wet and oozy, and you can not put machinery on it, as we can. Our land dries right up because our clay is close to the surface.

The CHAIRMAN. I should think the clay would hold the water up, too.

Mr. KNAPP. It does. That is the beauty of it. The clay, say, is about 12 or 18 inches under the surface, and that holds the water up. We forced good drainage there, and when this water is drawn off that land dries, so that the land is dry when we cut our rice, and consequently our people do not suffer with malaria. Then, as a running stream disposes of all impurities by knocking them to pieces, so the atmosphere gets rid of malaria, if you have enough of it.

The CHAIRMAN. How much further do you expect to go along with this work? How much longer do you think it will be necessary?

Mr. KNAPP. We are hoping to just keep it along. Every State is appealing for it, but we have not had any funds to go anywhere except just in front of the boll weevil. I am gradually withdrawing from western Texas and keeping along in about that belt.

The CHAIRMAN. You expect this appropriation to continue along annually?

Mr. KNAPP. It will take a few years, because the boll weevil will reach the Atlantic in five years.

The CHAIRMAN. Can not a lot of this work be obviated by taking it up with experiment stations now?

Mr. KNAPP. We are doing our best, Mr. Chairman. As far as I am concerned, I wish the work would close up. I am doing my best to get them to do everything they can.

The CHAIRMAN. We do not want it to close up until it has accomplished all the good it can accomplish, but these people in the Southern States ought to take the thing up themselves.

Mr. KNAPP. They would if they were like some of our people, but because it is talked about it does not change their practice. They remain the same. You have to go right in and get at them. There is no other way. That is my experience with that class of whites. I am positive they will not take the work up of their own initiative, but we are trying to get the stations to do it. One trouble is that the stations do not have the funds. They would do it if they could. I have a letter now from Louisiana appealing to me to try to help them a little.

The CHAIRMAN. Do you mean to say the State of Louisiana is so poor it can not put in ten or twenty thousand dollars?

Mr. KNAPP. I think one of your members can explain that as relates to Texas better than I can. Mr. Field can explain why it is they can not raise any large amount of money to give to their agricultural college. They are giving them about as much as they can.

The CHAIRMAN. How much do they give, Mr. Field?

Mr. FIELD. I do not remember now.

The CHAIRMAN. You say they are giving all they can give. How much are they giving now? The State of Texas is an empire.

Mr. KNAPP. President Houston told me that they were getting a great deal more from the United States than they were getting from their own State.

The CHAIRMAN. I have no doubt of it.

Mr. KNAPP. They tried to get \$10,000 for this propaganda work. They were going to try to carry it on through the farmers' institutes. They did not get enough to pay one man, and I had to supplement his expenses to travel around.

Mr. FIELD. Mr. Chairman, I hope you will not draw conclusions. We have a constitution in our State, and it was passed in what are known as granger times, and it is rather restricted. We have grown, but our shell is rather too small for us. We can not appropriate money there for every purpose. We are limited by a very rigid constitution.

Mr. KNAPP. I will say that if they could, there is no more willing Southern State than Texas.

The CHAIRMAN. How is Louisiana? What has she done?

Mr. KNAPP. Louisiana, if you will look at it, is controlled by the city of New Orleans and the sugar men. They are right down there at the front, and I think the city of New Orleans has one-third of the representation of the State, and when you add the sugar men they can control the State, and they do not think the cotton interests concern them very much.

The CHAIRMAN. What is the cotton production in Louisiana; do you remember?

Mr. KNAPP. In a good year they get six or seven hundred thousand bales. It is quite an important industry.

The CHAIRMAN. And \$50 a bale average?

Mr. KNAPP. Fifty dollars a bale this year. It is a beautiful, fertile, rolling country in northern Louisiana. They have tried to assist in this matter, but they seem to be hampered in certain directions and have not been able to do it. I am to have a conference with them on my return. That is the understanding with Secretary Wilson and Doctor Galloway, and we shall try to get the State to do everything they can, and where they simply can not do it we will do the rest.

Mr. FIELD. Mr. Chairman, I would like an opportunity to explain to the committee clearly about this work. I live right in the midst of what is known as the "boll-weevil section." I farm right extensively on the Brazos River, and I have observed this Government work very carefully. I have visited the farms and am perfectly conversant, I believe, with all the work that has been done in that section of the State. I will not impose upon the committee at this time, but I hope to be able at some time to make a full explanation of this matter in regard to the Government work.

I think the Doctor has, perhaps, given too much stress to the benefits that have been derived. We acknowledge that we have received great benefit from the Government, and it came to us at a time when we appreciated it very much; but there is very much to be done in this work yet. The partial exemption from the ravages of the weevil during the past year was due, we think, to the providence of God.

There was a dry summer, and when the sun shines on the weevil it dies, and we were enabled to make a very good crop. Cultural methods that were inaugurated by the Government have done great good, but the people did not need instruction. There is always a number of intelligent farmers who are working on their lines. We have been receiving valuable hints from the Government, but much work has been done on individual lines. People have relied on them-

selves, as they generally have to do, much more often than upon Government instruction or Government aid.

But the matter is, perhaps, too extensive now to take the time of the committee.

The CHAIRMAN. I will say, Mr. Field, that the time to take that up before the committee is when the entomologists appear before us.

Mr. FIELD. Yes; I will do it then.

The committee (at 2.15 o'clock p. m.) adjourned until Friday, January 26, 1906, at 10.30 o'clock a. m.

COMMITTEE ON AGRICULTURE,
House of Representatives, January 26, 1906.

The committee met at 10.30 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

The CHAIRMAN. Gentlemen, Mr. Pinchot, Chief Forester, is before us to-day on his annual appropriation.

STATEMENT OF MR. GIFFORD PINCHOT, FORESTER AND CHIEF OF THE BUREAU OF FORESTRY, DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. Mr. Pinchot, you told me there was a certain rearrangement of your statutory roll that you wanted to say a word about. Please state that briefly to the committee, and then we can go on regularly.

Mr. PINCHOT. We found; Mr. Chairman and gentlemen, that the present statutory roll did not fit the organization of the Forest Service. It is simply the roll as it happened to be arranged when the last bill was made up. I venture to suggest a rearrangement, which works out like this: The present statutory roll is \$81,960. The proposed statutory roll is \$97,960. The present statutory roll has 95 persons, and the proposed roll has 106 persons. The present statutory roll averages \$863 per person, and the proposed roll averages \$920 per person, or an increase of \$58 per person per year. This simply provides for the permanent clerical force. The old statutory roll did not provide a reasonable scheme of promotions. In the proposed roll we have tried to have the largest number of people in the lowest grades and proportionately less as the pay rises, so as to allow for a regular system of promotions. Under the old statutory roll such a plan is not possible.

The CHAIRMAN. Is the quality—if I may use that word—of your clerks less than the quality of those in the other scientific bureaus?

Mr. PINCHOT. No.

The CHAIRMAN. How do you rank them, in comparison with the clerks in other scientific bureaus?

Mr. PINCHOT. With my usual modesty, I think we have the best set of clerks anywhere in the Government service that I know of.

The CHAIRMAN. You have the lowest-priced clerks?

Mr. PINCHOT. I believe we have.

The CHAIRMAN. They say that they can not get good clerks for \$720 in the other bureaus. I notice that you have 10 clerks at \$720 each, and 19 clerks at \$600 each, and 11 clerks at \$480 each. We do not see this kind of clerks in the other bureaus, and I was wondering how you could manage to get along, paying those salaries to your clerks.

Mr. PINCHOT. We have a large amount of computation, and we find that we can get for \$40, \$50, or \$60 a month people able to do that work.

Mr. HENRY. What kind of people do you get for that—young men?

Mr. PINCHOT. No. Young women. Young men will not come for that price, but we can get young women.

The CHAIRMAN. That is pretty near \$10 a week. I will guarantee that the average lawyer in a village of 2,000 people does not pay his stenographer over that. I am only calling attention to the difference between Government salaries and private salaries. We are paying these people 50 to 75 per cent more than you pay in private business all the time.

Mr. PINCHOT. Was there anything further about the statutory roll?

The CHAIRMAN. No; I do not suppose there will be any objection to that. That is a rearrangement for the Bureau, and I do not suppose the committee will care to go into details on that.

Mr. PINCHOT. The total amount is taken out of the total sum, so that it does not increase the appropriation. I have certain changes which I want to present in the wording of the appropriation. I do not know whether you care to go into that.

The CHAIRMAN. That is, as to the arrangement of the clerks?

Mr. PINCHOT. Yes; and of the items of the appropriation.

The CHAIRMAN. Before you do that I think I would like to take up your items, paragraph by paragraph, and have you tell the committee what you have done during the last year. We want to know what you have done, and what you propose to do under the appropriation for the next year.

The first item reads: "To enable the Secretary of Agriculture to experiment and to make and continue investigations and report on forestry, forest reserves, forest fires, and lumbering." Suppose you give us the work that you have done on that in a brief way.

Mr. PINCHOT. Gentlemen, before I begin I will ask you to turn to page 200 in the report of the Forester. You will find there a diagram which explains the organization of the Forestry Service. As I follow the items, Mr. Wadsworth, I will refer to that diagram and show you what the relation of any particular piece of work is to the rest. The heavy black line of that diagram is the line of responsibility.

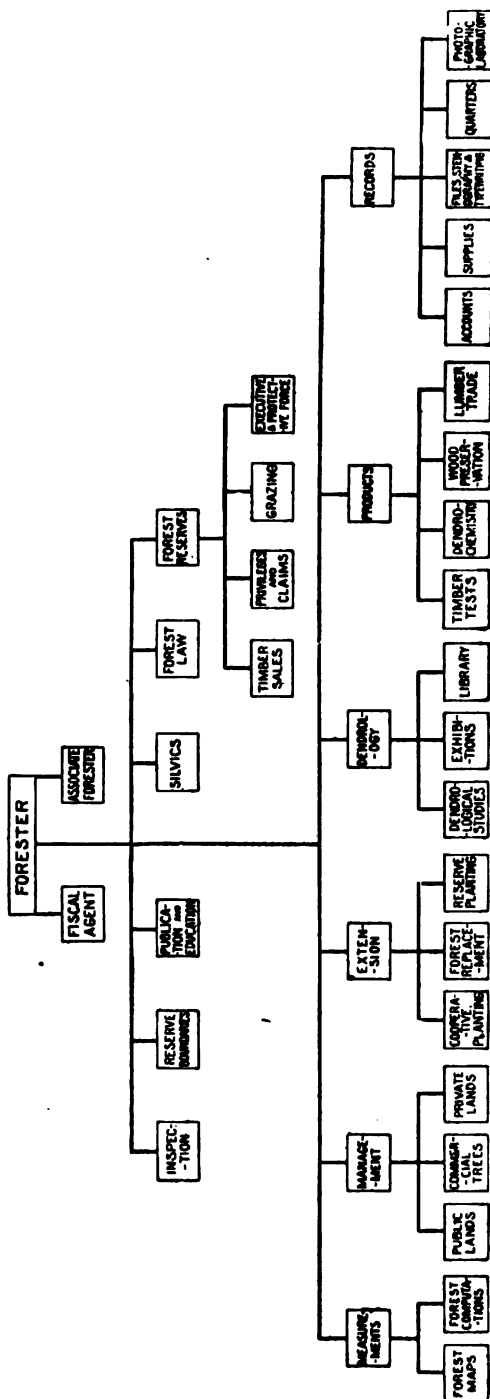
The CHAIRMAN. I see. That seems to make a very clear illustration.

Mr. PINCHOT. It shows exactly how each piece of work is related to the forester.

Mr. HENRY. What do you mean by "silvics?"

Mr. PINCHOT. Silvics is the science of trees in the forest. It is what we have to know in order to handle the trees. It tells how

ORGANIZATION OF THE FOREST SERVICE.



each tree behaves in its relations to its neighbors, and to light, heat, and moisture. Arboriculture is the knowledge of the individual tree, and silvics is the knowledge of that tree in its relation to the other trees of the forest. It is the basis on which we proceed.

The first item in the appropriation that I can speak about is forest reserves. You will see that forest reserves is a section in the office of the forester—that is, it reports directly to him, and is divided into "Timber sales, privileges and claims, grazing, and executive and protective force." The forest reserves were transferred to the Department of Agriculture February 1, 1905, and since that time have been completely reorganized and put on what, I think, is beginning to be a business basis. The idea is a double one, to handle the reserves better, and to make them pay for themselves. Before the reserves came over from the General Land Office, in the fiscal year 1903 they brought in about \$46,000. In 1904 they brought in \$58,000. In 1905, before they came over to us, they brought in \$32,000, and after they came over \$26,000, making for the year 1905 a total of \$59,000. The time from the 1st of February, when we took charge, to the 1st of July was occupied in organization, and therefore we were not able to apply the new scheme completely.

Beginning, however, on the 1st of July, the profits for the present year to January 22 have been, in round numbers, from timber sales, \$148,000; settlements for trespass, \$18,000; special privileges, \$3,000, and grazing, \$4,000, making a total to date of \$173,000.

The CHAIRMAN. For this fiscal year?

Mr. PINCHOT. Yes; up to date.

The CHAIRMAN. Practically the first six or seven months?

Mr. PINCHOT. Yes, sir.

Mr. SCOTT. What do you estimate the income to be for the half year?

Mr. PINCHOT. The sum just mentioned does not include grazing. In all, the income to June 30, 1906, will be about half a million dollars.

Mr. SCOTT. Now, can you explain in a few words how it happens that in a single year you have brought the income from this forest service up to a half a million dollars, whereas prior to your administration of it the receipts had not exceeded \$60,000?

Mr. PINCHOT. The reasons are very simple. Timber could not be sold inside the State where it grew; the reserves were not run on a business basis, and we have now a decision of the Attorney-General permitting us to charge for grazing, which is a new source of income.

Mr. SCOTT. How much have you realized from that?

Mr. PINCHOT. Only \$40,000 so far, but we expect to get over \$300,000.

Mr. SCOTT. That will be the largest source of income?

Mr. PINCHOT. It will.

Mr. SCOTT. And that was not available to the former administration?

Mr. PINCHOT. It was not.

Mr. SCOTT. These moneys are turned in, or you use them over again?

Mr. PINCHOT. They are turned into the Treasury, and for five years we have the right to use them over again.

Mr. SCOTT. Are we to understand that you will have this fund of \$500,000 at your disposal to carry on the work under your charge in addition to whatever we appropriate?

Mr. PINCHOT. In addition to whatever you give us.

Mr. SCOTT. How will you expend the greater part of it?

Mr. PINCHOT. It will be expended purely in the administration of these reserves, for the pay of supervisors and rangers, the construction of cabins, trails, and telephone lines, etc. I believe that within five years the reserves can be made self-supporting.

The CHAIRMAN. We are anticipating a little bit, but this is very interesting. You expect that in five years the forest reserves will be a source of revenue to the Government. However, that is about the last thing we want to touch upon in the bill. There is a lot of other matter that we want to come first.

Mr. SCOTT. I do not want to disarrange the programme, Mr. Chairman.

Mr. PINCHOT. What shall I go on with now?

The CHAIRMAN. We had taken up this matter of forest fires and lumbering.

Mr. PINCHOT. May I say just one word further about the reserves?

The CHAIRMAN. Yes; if you want to. Go on in your own way, and when you think that you have covered the matter then we will come back to this.

Mr. PINCHOT. When the reserves came over to us there were about 63,000,000 acres. Now there are, in round numbers, 100,000,000 acres. The new reserves which we think may be created during the present year are estimated to cost \$225,000. In other words, we are not only getting an income which enables us to diminish the net charge on the Treasury for the Forest Service this first year, but in addition we are administering very many more forest reserves, and I think we are administering them better and making them more useful to the people. It is not unlikely that we may be administering, before the end of the year, about twice the area we had in the beginning.

Mr. SCOTT. Where did you acquire this additional area?

Mr. PINCHOT. By proclamation of the President.

Mr. SCOTT. Can you tell us about what proportion of the 100,000,000 acres are actually forest land?

Mr. PINCHOT. Probably two-thirds. The rest consists of burns, land above timber line, open parks, and so on.

Mr. SCOTT. Are you authorized, without any special law, to acquire additional reserves?

Mr. PINCHOT. Yes; I believe so, but it has never been done. It is a question whether the Comptroller would interpret the bill which transferred the forest reserves to the Agricultural Department to mean that.

The CHAIRMAN. That you could acquire such additional lands?

Mr. PINCHOT. The wording of the bill is that the money can be used for the extension of reserves. But we have avoided that question.

Mr. SCOTT. I thought you said that you had expended \$225,000 for the extension of reserves?

Mr. PINCHOT. Oh, no. That is what we estimate for the cost of handling new reserves which may be created this year. These reserves are not yet made, but they may be.

Mr. SCOTT. It is what you estimate their administration will cost?

Mr. PINCHOT. Yes.

Mr. SCOTT. I thought you estimated it for the purchase of reserves?

Mr. PINCHOT. Oh, no. We have not bought an acre.

Mr. SCOTT. You never have bought any land?

Mr. PINCHOT. No; not up to this time. The United States has, but not the Forest Service.

Mr. HENRY. Has the United States bought land?

Mr. PINCHOT. Yes; they bought \$5,000,000 worth of land from the Blackfeet Indians of Montana and made a forest reserve of it.

Mr. HENRY. That otherwise would have been public land?

Mr. PINCHOT. Yes.

Mr. HENRY. That is the only instance in which the Government has ever bought land for this purpose?

Mr. PINCHOT. That is the only one I recall now.

Mr. HENRY. You know the Government bought lands in connection with the Mariposa?

Mr. PINCHOT. Not that I know of. There has been an attempt to buy the Calaveras Big Tree Grove for a national park, but it never has been done.

The CHAIRMAN. Will you tell me where there is authority to purchase lands? I do not recall that. It is not in this law.

Mr. PINCHOT. It is in the bill which transferred the forest reserves to the Department of Agriculture.

The CHAIRMAN. In the law transferring the forest reserves to the Agricultural Department from the Land Office?

Mr. PINCHOT. I will quote the law, which is as follows:

SEC. 5. That all money received from the sale of any products or the use of any land or resources of said forest reserves shall be covered into the Treasury of the United States, and for a period of five years from the passage of this act shall constitute a special fund available, until expended, as the Secretary of Agriculture may direct, for the protection, administration, improvement, and extension of Federal forest reserves.

The CHAIRMAN. "Extension" might cover it. I thought it was for the care and protection.

Mr. LAMB. The term "extension" carries the authority to purchase?

The CHAIRMAN. We will not detain you. I did not know of that power. We can put that in the record.

Mr. PINCHOT. Just one word more about the expenses of forest reserves. The total appropriation this year for the forest reserves is \$875,000. We estimate the receipts at \$400,000. They will be a good deal more than that, probably. We estimate the expenses at \$1,100,000, and that gives us a balance on the credit side—that is to say, it will cost considerably less this year, we estimate, to run the whole forest work than it did last year, although we have done easily twice the work that was done before. The personnel in the Forest Service last summer went up to nearly 1,300 persons, and at present it is a little more than 1,000.

The CHAIRMAN. An increase of property taken care of and a decrease in the number of people doing it?

Mr. PINCHOT. No; an increase of people and increase of property, and a decrease of expense.

The CHAIRMAN. That is it.

Mr. SCOTT. Has it come to your knowledge how much the expenditure of the Interior Department was reduced by the transfer of the forest reserves to your Department?

Mr. PINCHOT. I suppose \$375,000. It was last year. That is the amount which was cut from the appropriation for the Interior Department.

Mr. SCOTT. I suppose you have done no special work this year, the work being simply along the usual line of your handling of the Department?

Mr. PINCHOT. Yes; we are doing a good deal of special work. We are getting ready, for instance——

Mr. SCOTT. This is a very interesting subject to me, but if you are going to refer to forest reserves later in your remarks I will not ask any more about that subject now.

Mr. PINCHOT. If it is agreeable I will take up the relation of each one of our separate lines of work to the forest reserves, showing that almost everything we are doing is aimed directly at the management of the Government lands.

One more statement about the Government reserves: I think they are pretty good business for the Government. We have estimated some 270,000,000,000 feet of timber standing on them now, which at a dollar a thousand feet would be worth \$270,000,000, and we think that the reserves are easily worth \$300,000,000.

Mr. LAMB. Is it not worth more than a dollar a thousand?

Mr. PINCHOT. A great deal is worth more than that, and I think that it is a conservative estimate to say that the reserves are worth \$300,000,000. We are administering them at a yearly cost of less than one-third of 1 per cent of their value, which is pretty cheap. They are certainly increasing in value at the rate of 10 per cent per annum. What, with the rise in timber prices and the growing scarcity of land, I do not know of any other branch of the Government, except the General Land Office, that has so large a value of Government property in its charge. I think it is considerably larger than the Navy and considerably larger than the Army.

The CHAIRMAN. Larger than the Army and larger than the Navy?

Mr. PINCHOT. I think so. I have not the exact figures on that, of course; but that is my guess about it.

Mr. LAMB. That is an astounding statement. What part of the country are these reserves in?

Mr. PINCHOT. They are in all the Western States and Territories except Nevada, and there will be some there after a while. What I have been trying to do is to put this service on a business basis. We pay less for our clerical service than any other Government office that I know of, and I think we have as good clerical service as anybody. I think it is better, in fact, than that of any other bureau that I come in contact with. Our system of doing business is, I venture to think, very good. We have, for example, a very careful cost-keeping system, and can tell you exactly what any part of the work actually costs and how its cost compares with its results.

The CHAIRMAN. You are a member of the Keep commission?

Mr. PINCHOT. I am.

The CHAIRMAN. Whose object is to suggest a reorganization in all the Departments?

Mr. PINCHOT. The Keep commission has been over the Forest Service, and some of the members have expressed themselves as very much pleased with the result of their examination. I do not see any reason why the Government service can not be conducted in a businesslike way, and, as far as we have been able to go in the Forest Service, I think we have done so.

Mr. HENRY. I wish you would preach that to the Army and the Navy Departments.

Mr. PINCHOT. The Forest Service has grown very rapidly. It would not have been surprising, therefore, if a certain amount of looseness had crept into our organization. But I do not think that it has. It is fair to say that the business of the Service is up to date and in good condition throughout.

The CHAIRMAN. What is the highest-priced stenographer you have in your Department; can you recall from memory?

Mr. PINCHOT. Yes. The highest-priced stenographer is my own secretary, who is a great deal more than a stenographer, and he is getting \$1,600 a year.

The CHAIRMAN. I mean as just a stenographer alone?

Mr. PINCHOT. The highest priced is \$1,200.

The CHAIRMAN. And from that they run down how low?

Mr. PINCHOT. Seven hundred dollars for some of them.

Mr. DAVIS. Do you not find a little discontent in the Department among the clerks when they compare their salaries with what others get?

Mr. PINCHOT. Yes.

Mr. DAVIS. You have found that, I am sure. Some of them want to be transferred, not because they do not like the work or the employment, but they simply say that the salaries in the Forestry Division are lower than in any other branch of the Government. That is my experience; and I have gotten one transfer on that account.

Mr. PINCHOT. But the answer which I am obliged to make to that is that I can get all the people I want, and more, too, for the salaries we pay.

The CHAIRMAN. That is a knockdown argument.

Mr. DAVIS. That is exactly it. I have been informed that the officials there state, "If you will not work for this, I can get some one else to do so." But the argument in the Forestry Service does not prevail in the other Departments.

Mr. LAMB. They can not go into civil life and get more, can they?

Mr. DAVIS. I think they can; a little.

Mr. LAMB. Not on the railroads, I know. They can not get any more than that in employment on the railroads that I have business with.

Mr. PINCHOT. It is a very slight increase over our scale.

Mr. LAMB. I do not believe yours is as high. I know men working there for \$70 a month, and you do, too, I reckon.

Mr. PINCHOT. Yes.

The CHAIRMAN. I am going to ask you a question. In the investigation by the Keep commission, how have you found Government salaries as compared with the outside salaries?

Mr. PINCHOT. Government salaries for clerical positions and for labor are very much higher.

The CHAIRMAN. How much?

Mr. PINCHOT. At a rough guess, I would say about one-third.

The CHAIRMAN. Do you take into consideration the sick leave with pay and the annual leave with pay?

Mr. PINCHOT. No; that is additional.

The CHAIRMAN. That is additional. The Government clerk loses about one-sixth of each year with pay.

Mr. HASKINS. And the hours are shorter, too; are they not?

Mr. PINCHOT. Yes.

The CHAIRMAN. They get all their leave, do they not?

Mr. DAVIS. They do if they are allowed to.

The CHAIRMAN. Do they not get it as a rule?

Mr. PINCHOT. Not in the Forest Service.

The CHAIRMAN. As the result of your Keep commission investigation, what do you say as to that?

Mr. PINCHOT. In some of the older organizations, which have fallen into the regular Government rut, more or less, we found as high as 40 per cent of the Government clerks taking all of their annual and sick leave.

The CHAIRMAN. That is sixty days annually; 40 per cent of the clerks?

Mr. PINCHOT. In some of the offices.

The CHAIRMAN. And do you think that 20 per cent of the clerks in all of the Departments got their sixty days?

Mr. PINCHOT. That would be an understatement, I think.

The CHAIRMAN. An understatement?

Mr. PINCHOT. Yes.

The CHAIRMAN. Did 30 per cent of them get their sixty days?

Mr. PINCHOT. I should hardly think so, but that is a guess, of course.

The CHAIRMAN. You have been on this commission, and it ought to be a pretty good guess.

Mr. PINCHOT. I could get you that absolutely, because we have the record for every clerk in Washington for the last four years.

The CHAIRMAN. That is an interesting fact.

Mr. HENRY. When is the Keep commission going to report?

Mr. PINCHOT. It has reported on the Government printing and the Bureau of Statistics. It has also reported on the Lanston-Mergenthaler fight in the Government Printing Office. But we shall be making reports now at intervals of a few months, I suppose. There is a very large amount of work.

Mr. SCOTT. You are reporting by piecemeal?

Mr. PINCHOT. Yes. I want to answer the other half of your question, about comparative salaries for high-grade work. The showing is not as good there. It is true that executive ability and higher capacity of all kinds are underpaid in the Government service. The Government underpays its higher officials. I do not say it in a critical or cynical spirit at all, but I think it is a fact.

Mr. SCOTT. I notice on page 203 of your report that you do not credit Kansas with any forest reserves at all. My recollection was that there was some land set aside as a forest reserve.

Mr. PINCHOT. The Garden City Reserve. That was set aside since this report was made.

The CHAIRMAN. Take up next the subject of forest fires. That is the next thing in this item.

Mr. PINCHOT. The question of forest fires comes in simply as a part of the regular work of protecting the forest reserves and of trying to create a right sentiment among people who own timber lands. I have not yet, I am sorry to say, the full reports from the forest reserves as to fires this year. But in spite of an exceedingly dry year we have had a comparatively small number of fires. Important fires have occurred only in four, I think, of the reserves, and there are now 98 reserves. We were rather lucky in keeping fires out. We have also been working with railroad companies and others to create a sentiment against fires, and I may report that that sentiment has made very vigorous progress. Also we have made it a fixed policy that when any railroad company wants to cross one of the forest reserves it must agree to burn oil or use electricity or use some other source of power that does not throw sparks. There are two trans-continental companies that applied to go through the reserves recently and one of them has agreed to burn oil and the other will do so.

The CHAIRMAN. In going through the national reserves?

Mr. PINCHOT. Yes. There is no way to stop fires if you use a spark-throwing locomotive.

The CHAIRMAN. Not even with a close screen at the top of the stack?

Mr. PINCHOT. The screen and the engine do not go well together. The engine does not steam well with the screen.

The CHAIRMAN. The gases would soon break up a screen?

Mr. PINCHOT. The screen has not worked well. The engineers do not like it.

The next point is lumbering. We are doing a great deal of work with lumbermen all over the country. If you will follow on this chart of organization the black line down to "Management," you will see under "Management" a section of "Private lands." The essential thing there is that we give advice to lumbermen on the ground as to how to handle their timber lands with the idea of promoting forestry. They pay the expenses and we furnish the expert information.

The result of that has been that forestry has now become a practical business question with lumbermen all over the country. We are rapidly losing our best men for very large salaries to lumbermen who want to introduce forestry on their own lands. In a way I am not sorry, because, while we need these men, they also need them, and the men are still in the country.

The CHAIRMAN. Along that line of work?

Mr. PINCHOT. Yes. Of course we ought to pay our men a fair price, so that we would not lose them faster than the Government could afford to let them go.

We are getting very satisfactory support from the lumbermen all over the country. The National Lumber Manufacturers' Association, which is the representative body, last spring appointed a committee to raise \$150,000 for a chair of lumbering in the Yale Forest School, on the ground that the forester was a commercial necessity for them, and they wanted men who could handle their own special work; they wanted foresters well trained in lumbering.

Mr. SCOTT. Is there a school of forestry here in Washington?

Mr. PINCHOT. No.

The CHAIRMAN. The next is "To advise the owners of woodlands as to the proper care of the same." That comes under the same head as lumbering?

Mr. PINCHOT. Yes. The great majority of the woodlands of the nation are and must always remain in private hands; and to save the forests of the nation is impossible unless we can convert their owners to conservative ideas.

The CHAIRMAN. The next is "To investigate and test American timber and timber trees."

Mr. PINCHOT. One of the most important pieces of work we have is this attempt to influence the methods of using timber. We have a very limited supply of wood in this country, compared with our needs and our total consumption; and not only our total, but also our per capita consumption is constantly increasing. The candle is being burned at both ends. One of the best ways to save our forests is to reduce the waste in the use of timber. Another is to save the more valuable species, by finding which of the less valuable and more plentiful kinds can be used for certain purposes for which the best kinds are now being consumed. We have undertaken with some success, for example, to introduce the use of inferior woods for railroad cross-ties, of which about 120,000,000 for steam roads, and perhaps 30,000,000 more for electric roads, are being used each year. As Secretary Wilson puts it in his annual report, it would require a tree growing at either end of each tie on every railroad track in the country to keep that tie in the track. Two trees must be growing in the forest to keep one tie in the track. And this is only one of the huge demands upon our forests.

The CHAIRMAN. By using preservatives on those inferior timbers?

Mr. PINCHOT. Yes; and better methods of seasoning, etc. Commercial concerns are very slow to take up these things, but if the Government can show they are worth while, they do take them up. For the benefit of the cooperage men, the box-board manufacturers, and the vehicle manufacturers, and so on, we are doing the same thing. There is, for example, a vast quantity of poplar in this country which has never been considered good for much as lumber. Our experiments show that that is one of the best box timbers.

Mr. COCKS. Is that the same as whitewood or yellow poplar?

Mr. PINCHOT. No; that is much too expensive for box boards. In the same way we are studying the use of inferior timbers for the manufacture of paper.

Mr. COCKS. How can you carry on your experiments with the railroad ties unless you bury them in the ground?

Mr. PINCHOT. We do that, and we study the relation of preservatives and to strength, so as to ascertain what is the effect of different preservatives on the strength of the wood.

Mr. COCKS. It is a question of decay more than anything else with the railroad tie?

Mr. PINCHOT. Yes; and a question of holding——

Mr. LAMB. Holding the spikes?

Mr. PINCHOT. Yes; holding the spikes. So far as decay is concerned, that question can be solved through creosoting them. When

creosote is used the trouble is no longer their rotting, but their wearing out.

The CHAIRMAN. That is done abroad?

Mr. PINCHOT. Yes.

The CHAIRMAN. This creosoting is no new thing?

Mr. PINCHOT. The creosoting is not, but its introduction to the American railroad man is, in certain ways, new, and so are many other parts of our work.

The CHAIRMAN. Was this process of boiling and cooling in a vat known to them?

Mr. PINCHOT. No.

The CHAIRMAN. How have they been doing it?

Mr. PINCHOT. They have been forcing it in by pressure. We found, for instance, that this boiling process is applicable to telegraph and telephone poles. We have been watching these studies in cooperation with the Bureau of Plant Industry, and we have succeeded in turning the attention of a great many large users to forestry through this process of getting them interested. In the same way we are getting the large railroad companies to buy up areas of land to produce their own ties, which is their only safety for the future. We have succeeded in calling their attention to the whole forest question, and they are acting.

The CHAIRMAN. What railroads have done that?

Mr. PINCHOT. The Northern Pacific, Pennsylvania, Illinois Central, Baltimore and Ohio, and others; and the big western roads are getting ready to hold the lands they have and to acquire others.

Mr. COCKS. Can you give us any idea of what the land is worth now to grow timber on?

Mr. PINCHOT. Where?

Mr. COCKS. In the Eastern States and the Middle States—Pennsylvania, Maryland, and Virginia, and so on.

Mr. PINCHOT. It would be a mere generalization, but I think from \$1.25 to \$2 an acre.

Mr. LAMB. It is about \$20 in my section.

Mr. PINCHOT. That is with the timber on it.

Mr. LAMB. Yes, sir. There is not much.

Mr. PINCHOT. With the standing timber?

Mr. LAMB. Yes.

The CHAIRMAN. For what other purposes do you test the timber besides ties?

Mr. PINCHOT. For use as construction timbers, and so on. For instance, we are trying to get exact facts for the engineers and architects in regard to spruce and all kinds of pine, and California redwood and red fir on the Pacific coast.

The CHAIRMAN. I thought that that had all been done, not at the St. Louis Exposition, although it was done in that city, but I mean before that by a man named—

Mr. PINCHOT. Johnson?

The CHAIRMAN. Yes; and before that by a man who afterwards went up in New York—named Roth, I believe.

Mr. PINCHOT. Yes, sir.

The CHAIRMAN. Then there is another man named Fernow?

Mr. PINCHOT. Yes; but he only scratched the edge of the subject. It is a very big subject.

The CHAIRMAN. Will you tell the committee just practically how you do that? You will take a timber of pine 12 by 12, and how do you treat it?

Mr. PINCHOT. We want first to find out what stress the beam will bear. That is ascertained by one of these great testing machines that crushes the beam and at the same time records the pressure.

The CHAIRMAN. It indicates the pressure?

Mr. PINCHOT (continuing). It indicates the load. We then make a number of subsidiary tests. We make very careful records of the beam, what its condition was, and where it came from, and then we make a number of secondary tests on small pieces of the beam.

It might interest the committee to know the result of the comparative cost of the tests we have been making to the commercial tests. We got bids on making tests for twenty wooden stringers. On the basis of the 180 tests necessary the best bids were \$7.70 a test for the commercial and \$4.40 in the university laboratories. The tests by the Forest Service have been made at an average cost of \$1.91, so that we are not wasting any money here.

Mr. BROOKS. To what extent are the building trades and private interests availing themselves of the results of your work?

Mr. PINCHOT. Very much.

Mr. BROOKS. Is that tendency growing?

Mr. PINCHOT. It is growing very rapidly. I was saying to Mr. Wadsworth before the meeting opened that there is a strong demand that we should extend this work, and the best way to do it is to establish a central laboratory here in Washington which can keep the general direction of the rest of it.

Mr. BROOKS. Is there anything about your testing that the building trades or the construction men could not do themselves if they wanted to, after they knew how?

Mr. PINCHOT. No; there is nothing that they could not do, if they could get the proper men and machinery, and if they could combine to pay the cost.

Mr. BROOKS. Then it is the old question we have had up here so many times of the difference between an ocular demonstration and a written suggestion?

Mr. PINCHOT. Yes; very much. Then these tests are valuable over so large an area that it is pretty hard to ask any one local body of men to assume the burden of them.

The CHAIRMAN. Assuming that the timber is of exactly the same quality, will the 6-inch timber support exactly half the weight that the 12-inch timber will?

Mr. PINCHOT. You have got me. I do not know. I should think not.

The CHAIRMAN. I do not think so myself. I was just asking.

Mr. LAMB. That was a very interesting inquiry.

Mr. PINCHOT. We can tell you that very easily from our own tests.

The CHAIRMAN. Have you not tested along on that line at all?

Mr. PINCHOT. Yes; we can give you the exact pressures that the different sorts of beams have borne.

Mr. COCKS. There is a regular ratio, probably.

Mr. PINCHOT. Yes.

The CHAIRMAN. How far can you carry these investigations?

There is a limit; and you must wind them up in a year or two, I should think.

Mr. PINCHOT. We could, except that there are so very many commercial uses for timber. We have 600 kinds of trees in the United States, of which 150 are perhaps, now, in full commercial use, and the number of trees that are being used is constantly increasing.

The CHAIRMAN. I was noticing in the building of a little house the other day, as I was taking a walk, that they were still using for joists and beams, here, yellow pine.

Mr. PINCHOT. Yes.

The CHAIRMAN. We would use spruce and hemlock.

Mr. PINCHOT. As one kind of wood gets expensive they move on down to another.

Mr. LAMB. This comes from Canada?

The CHAIRMAN. No, sir; from the United States. We do not go to Canada for hemlock. All we get from Canada is white and yellow cedar posts. I do not think we get any hemlock or pine at all. Our pine comes from Michigan and our hemlock comes from the neighborhood, now.

Mr. LAMB. North Carolina is sending furniture woods of all kinds to Grand Rapids, and has been for some years.

Mr. PINCHOT. The next is "To seek, through investigations and the planting of native and foreign species, suitable trees for the treeless regions."

While the investigation has been going on in this country and abroad, the essential thing now is to encourage planting by the owners of small farms for windbreaks and wood lots on the treeless plains. We have also a prodigious amount of planting to be done in the various reserves. Before the reserves were made they had been abused for many years. Fires had run in them long before the white man came in. There are millions of acres of standing dead timber in the reserves, and other areas that contain no timber now which once were wooded.

As the principal object of the reserves just now is, and will be for many years, to protect the headwaters of streams used for irrigation, we must replace these forests, and we are going to have to plant, unless I am mistaken, on a scale that has never been seen anywhere in the world. We have probably 30,000,000 acres in the forest reserves which must be planted up. That is a rough guess. We must develop cheap methods of seeding and planting and of producing plants. We are already producing them in our nurseries at a small fraction of what they can be bought for, and we must systematically expend year after year very large sums of money to put these forests back. We are going to be able to earn that money ourselves a little later, but the demand is going to be enormous.

Mr. SCOTT. You are familiar, are you not, with the forest region through the most heavily timbered parts of Colorado?

Mr. PINCHOT. Yes.

Mr. SCOTT. How long would you think it would take for the forest which has been burned over to restore itself without any planting?

Mr. PINCHOT. In very many cases it practically never will, the reasons being that the seed trees have been burned away over such large areas that there is no place for the seed to come from, and that the

grasses have taken such possession of the ground that the young seedlings can not get in.

Mr. SCOTT. And you might give still another reason, and that is that the heavy rains falling upon the unprotected ground have washed the soil, on top of the rocks, away?

Mr. PINCHOT. Yes.

Mr. SCOTT. How old would you say that spruce trees in the higher Rockies a foot in diameter are?

Mr. PINCHOT. In the higher Rockies they would be in the neighborhood of 200 years old.

Mr. SCOTT. I just wanted to get an idea of how long it was going to take nature to reproduce those forests?

Mr. PINCHOT. So long that I think there is no question but that we must go to work artificially to help nature.

Mr. SCOTT. Even if we plant them, it will be two hundred years before they are really timber size?

Mr. PINCHOT. I want to recall that you said in the higher Rockies.

Mr. SCOTT. Yes. Spruce only grows in the higher Rockies.

Mr. PINCHOT. There is a great deal of spruce that grows very much faster than that. There are many places where a tree a foot through would not be 100 years old.

Mr. SCOTT. But the pine grows in the lower altitudes, and the spruce higher up?

Mr. PINCHOT. Yes.

The CHAIRMAN. The Norway spruce grows faster than that?

Mr. PINCHOT. Yes; the planted trees will grow faster than that.

The CHAIRMAN. Norway spruce will get to be a foot in diameter in a comparatively few years?

Mr. PINCHOT. Yes.

Mr. LAMB. On the Atlantic coast we can get pine a foot in diameter in twenty-five years.

Mr. PINCHOT. Yes.

Mr. BROOKS. It is probable, is it not, that you can get reasonably good results, a diameter of one foot, say, in fifty years?

Mr. PINCHOT. You can get valuable results in less than fifty years, because by planting the little trees close together they will produce a forest cover and begin to protect the soil from the sun in twenty-five years.

Mr. BROOKS. Last year I went through the White River Reserve, and there were perhaps a couple of thousand acres that had been burned over, and the date of that burning was known—it was in 1888—and that new growth was from 6 to 12 inches through, and it formed a very decided factor in the water storage and things of that sort.

Mr. SCOTT. Are you doing anything on the Garden City Reserve in the way of planting?

Mr. PINCHOT. We have not begun yet. We have had difficulty in getting our nursery arrangements made, but we will begin this spring.

Mr. SCOTT. Will you plant seeds or small plants?

Mr. PINCHOT. Small plants.

Mr. FIELD. Is it the policy of the Government to replace these forest with native trees, or do you substitute some other varieties?

Mr. PINCHOT. Native trees, almost entirely. Natural selection has been working on those trees for ages, and we find they are better adapted to their own localities than any others, as a rule.

There is one little item here: "To erect necessary buildings: *Provided*, That the cost of any building erected shall not exceed \$500." That means buildings for the nurseries, headquarters for forest officers in the reserves, and so on. I want to suggest that that cost should be increased to \$1,000, because where we have had a considerable number of men to house at one place, we have had to build two houses at \$500 apiece, instead of building one for \$750. It is more expensive that way. That change will not increase the total expense, but rather diminish what we have to spend.

The CHAIRMAN. Suppose you read the next paragraph right on, and comment on it as you go.

Mr. PINCHOT. The next reads: "For all expenses necessary to protect, administer, improve, and extend the national forest reserves."

The CHAIRMAN. That would be covered now. Then it reads: "And officials of the forest service designated by the Secretary of Agriculture shall in all ways that are practicable aid in the enforcement of the laws of the States or Territories in the prevention and extinguishment of forest fires and the protection of fish and game, and all persons employed in the forest reserve and national-park service of the United States shall have authority to make arrests for the violation of the laws and regulations relating to the forest reserves and national parks; and any person so arrested shall be taken before the nearest United States commissioner within whose jurisdiction the reservation or national park is located for trial."

That power was transferred to you from the Land Office, was it not?

Mr. PINCHOT. No. They never had it.

The CHAIRMAN. They never had it, but we gave it to you.

Mr. PINCHOT. Yes. They tried to get it for many years. This same provision also exists in a separate bill, and I would cut it out of the appropriation bill for the sake of shortness. What this provision signifies is that over these large areas the forest officers are not merely employed in looking after the reserves, but are helping in all ways in good government. The regulations provide that they shall assist in the enforcement of the stock laws of each State, shall prevent the stealing of cattle and horses, and they are made game protectors.

Mr. HASKINS. Let me suggest that the very language of this item is provided for in the act of February 6, 1905.

Mr. PINCHOT. It is unnecessary here.

The CHAIRMAN. I would like to get in this paragraph as much of the law governing your Bureau as possible, because it is so much more accessible to the members of the committee if it is here. It would be very much more desirable, if it is agreeable to you, to have it incorporated in this paragraph. In your recasting of the paragraph have you cut it out?

Mr. PINCHOT. Yes; I did; because it is superfluous.

The CHAIRMAN. If that was out of the paragraph it is 10 to 1 that 9 out of 10 of us would not know that you had that power.

Mr. PINCHOT. It does not make any difference to me whether it is left in there or not.

Mr. FIELD. Does the general law in that section confer upon those timber agents the usual power conferred upon a constable for the enforcement of the criminal laws?

Mr. PINCHOT. No; only the forest laws. That would keep them too busy outside of their regular work.

Mr. FIELD. You spoke of horse thieves.

Mr. PINCHOT. That is simply because of the use of the reserves for stock grazing, and the presence of this stock on the reserves under permits makes it advisable for us to help in protecting them.

The CHAIRMAN. In answer to a suggestion of Mr. Brooks that your force is underpaid, you do not mind repeating what you said before he came in, do you, to the effect that you find no difficulty in filling all of your places with competent men?

Mr. PINCHOT. I said that with reference to certain clerks.

The CHAIRMAN. I thought you said that the Bureau was underpaid?

Mr. BROOKS. No, sir; I said the forest rangers. I want to qualify that. I do not know anything about the salaries in Washington. I mean to qualify it with reference to the forest service in the field. Now, it is a fact that the Forest Service gets the services of men, to my personal knowledge, for \$720, \$840, and \$900 a year who can go right out and get \$1,200 or \$1,500 in other branches of work, because they have thrown out to them the lure of promotion, and some of them are in personal touch with that work and like it and are really doing it at a financial loss. One man I know is a graduate of Columbia and is a finely educated all-around man.

Mr. COCKS. He is a forest ranger?

Mr. BROOKS. Yes, sir; right on the range, and he gets \$900 and keeps two horses. There is another man I know, who is also working for \$900, who to my certain knowledge went out of a business that paid him more than that; and the only reason he did it is because he hopes to be made a supervisor some day, at \$2,000 a year.

Mr. PINCHOT. I would like to say that we have been promoting the rangers up to \$75 a month when they have to keep two horses. The men used to get \$60 a month. That is better than it was, but it is not all right yet.

The CHAIRMAN. The next is "For ascertaining the natural conditions upon and for utilizing the national forest reserves." That you have touched upon in your remarks on forest reserves?

Mr. PINCHOT. That simply means that we make careful examinations of the areas that are to be suggested to the President for forest reserves.

The CHAIRMAN. The next is, "The Secretary of Agriculture may, in his discretion, permit timber and other forest products cut or removed from the forest reserves of the United States, except the Black Hills forest reserves in South Dakota and the forest reserves in Idaho, to be exported from the State, Territory, or district of Alaska, in which said reserves are respectively situated."

Now, what are you doing along those lines in the way of selling timber? That is what you hope in the future, to have the receipts to cover expenditures?

Mr. PINCHOT. Yes, sir. Without that provision we could not sell timber across State lines, and that, of course, kept the timber out of the general market. One of the reasons we have been able to make

these larger sales is because of that provision. There was more good legislation secured for the forest reserves last year than for the previous ten years. It put us upon a plane where we could do business.

The CHAIRMAN. You remember under what pledge we gave it to you?

Mr. PINCHOT. I made this pledge, which I will repeat, that if you gentlemen will give me the right to charge for grazing and timber sales——

The CHAIRMAN. You have got that.

Mr. PINCHOT. Yes; I have got that. With that right and a million dollars a year I will never ask for any further increase if I can expend the money that I earn.

The CHAIRMAN. And you will be earning as much as you spend in how many years, do you say you hope?

Mr. PINCHOT. I hope in from three to five years the Service can be made self-supporting.

The CHAIRMAN. And in how many years from that time, if it is possible for you to make an estimate, can you make it productive to the Government?

Mr. PINCHOT. I think in five years there ought to be considerable net returns to the Government.

The CHAIRMAN. Right here let me ask you if the German and the French forests are always sources of income?

Mr. PINCHOT. Yes, sir. This year it will cost \$600,000 and over to run the reserves alone, but we will make over \$500,000. That is, the forest reserves will be practically self-supporting this year, and I hope to pay for all of the Forest Service in from three to five years.

The CHAIRMAN. Now we come to the line of questions about the cost of maintenance, and so forth.

Mr. PINCHOT. The next reads: "For the employment of local and special fiscal and other agents, clerks, assistants, and other labor required in practical forestry, in the administration of forest reserves, and in conducting experiments and investigations in the city of Washington and elsewhere, and he may dispose of photographic prints at cost and 10 per cent additional."

The CHAIRMAN. What have you done on that? Is there any demand for your photographs?

Mr. PINCHOT. Yes, sir. It does not amount to much, but we sell a certain amount of that kind of material. We have the best collection of forest photographs, far and away, that there is in this country, and the best one that I know of in the world. Most of the illustrations of forests that get into the magazines come from us, and we need some way of disposing of them besides mere gift. The Secretary may dispose of "Other property or materials under his charge in the same manner as provided by law for other bureaus." That has to do with this matter of charging for grazing, and so on.

The CHAIRMAN. Under that you have the power to charge for grazing?

Mr. PINCHOT. Yes. There is in this little book, which we call the Use Book, a letter from the Attorney-General giving the basis of the arrangement under which we can charge for grazing.

The CHAIRMAN. Under what conditions do you make charges for grazing? Do you give competitors any opportunity to bid for the privilege?

Mr. PINCHOT. You will find in this leaflet the revised regulations for grazing. This is not a question of competitive bids, because if that were done the large owners would take up the whole country. We have to use the allotment of grazing as one of the means for the settling of the public lands. We give the small owner preference over the large owner, and the man who was there first the preference over those who came afterwards. There are many people living in the neighborhood of the reserves or inside of them who have a few head of stock, and if they were not allowed to go on the reserves they would be ruined.

Mr. BROOKS. Any element of competition would be very serious?

Mr. PINCHOT. Absolutely ruinous.

Mr. BROOKS. The whole question of grazing is very difficult, and it has to be handled with great care, and it is going to work great hardships even then, and if every consideration and encouragement was not given to the little fellows who have gone out there and lived for years, maintaining a kind of precarious existence, the suffering would be awful.

Mr. PINCHOT. I would be glad to see the little fellows given even more consideration than they have now. The big fellows can take care of themselves.

Mr. SCOTT. Do you make a charge by the head for grazing?

Mr. PINCHOT. Five to 8 cents a head for sheep, and 20 to 35 cents a head for cattle and horses for the summer grazing season.

The CHAIRMAN. That is cheap enough.

Mr. PINCHOT. We have just had a big fight on that question. The Colorado people held meetings and sent a delegation to Washington protesting to the President against the charging of any fee.

Mr. BROOKS. We are going to have another meeting on Monday.

Mr. PINCHOT. I am going to that one, too. I want to be on the firing line.

Mr. BROOKS. They have had the free use of the public domain for grazing without pay from time immemorial. They simply put it on an equitable principle, without any prescription. They think that the public domain is for the use of the settler until patented, and even when separated into forest reserves these people contend that there is no reason why the Government should then inaugurate a leasing system. A leasing system is like a red flag to a bull all through that section.

The CHAIRMAN. They have been getting something for nothing, and they object to paying for it?

Mr. BROOKS. Yes; and one thing they say is that the Government comes in and takes five or ten million acres and puts it into a forest reserve—

Mr. HENRY. It belongs to the Government.

Mr. BROOKS. Yes; but I am speaking of their position. They put it into a forest reserve, and right outside there may be 10,000 or 15,000 acres that is not in a forest reserve, and the man who is in the mountains has to pay a tax on his stock, while the man who is on the plain ranges his cattle on the public domain and does not pay a cent.

Mr. HENRY. Why does not the man on the mountain move down on the plains?

Mr. BROOKS. Because the available places on the plains are taken.

Mr. HENRY. They have no right to patent them.

Mr. BROOKS. Yes, sir; but it depends on the water holes. It is a question to be managed with great skill.

Mr. PINCHOT. We have stopped the cattle and sheep fight, and there is no more shooting on the forest reserves. No more killing goes on. As to the difficulty of handling all these questions, we have in the forest reserves now, or will have, a great part of the timber supply of the West, nearly the whole of the water supply, and nearly the whole of the summer range. The summer range controls, of course, the year-around range, and that means that the Government really is in a sense providing for all the industries of the country, because there is no industry that is not tributary to the reserves in some way, either in timber, water, or grass; and that means that the prosperity of the West depends largely on the way these reserves are handled. Do you not think so?

Mr. BROOKS. Yes; and that is why you ought to have the very highest class of men as your forest officers; and you should not start them with \$720 a year. You have got to have men with great tact, and who know the country and have good judgment, and are broad-gauged men. That is not arguing for any fellow who has a job, but for the general principle.

Mr. PINCHOT. Yes. It is so great a thing that it must be handled on the broadest lines.

The CHAIRMAN. The next is "For collating, digesting, reporting, illustrating, and printing the results of such experiments and investigations." You are going too far in illustrating?

Mr. PINCHOT. No, sir.

The CHAIRMAN. There was a tendency several years ago (that we tried to curb) of absolutely wasting money in illustrations, as we thought. That was very expensive work.

Mr. PINCHOT. Yes. I want to mention the policy that I think is the right one for the Forest Service in regard to publications. It is this: We ought to practically stop printing expensively illustrated publications or to print very few of them. We ought to print, on the other hand, very large numbers of very simple and very cheap pamphlets that could be sent widely over the country. It seems to me that when you have information that the people ought to have it is foolish to print 15,000 or 20,000 copies for a nation of 80,000,000 people. Consequently, I have made a mailing list of the best people I could get hold of all over the United States, professional and otherwise, which makes 550,000 names.

Mr. SCOTT. Does that include the newspapers?

Mr. PINCHOT. No. We have a separate list for them. This list comprises lawyers, farmers, merchants, teachers—the best people we could get throughout the United States.

My idea of proper publicity is that we should print leaflets which would cost, say, a cent apiece, and where illustrations are needed to use woodcuts, which do not add anything appreciably to the cost, and send out to institutions and to men specially interested a much smaller number of illustrated bulletins. That is a brief statement of my idea.

Mr. SCOTT. You are sending articles out to the newspapers pretty regularly?

Mr. PINCHOT. Yes.

Mr. SCOTT. Of a column or so in length?

Mr. PINCHOT. Here are the press bulletins for the last two months [indicating].

Mr. SCOTT. How much of your force is spending its time preparing those press bulletins?

Mr. PINCHOT. Three men are partly occupied with it. They also edit all the publications of the service and do a great deal of other similar work.

The CHAIRMAN. That comes under publication and education?

Mr. PINCHOT. Yes.

Mr. SCOTT. And you send those articles out on the theory that they are calculated to create a sentiment friendly to the work of the forestry bureau?

Mr. PINCHOT. No.

Mr. SCOTT. And in that way encourage the cooperation of the people?

Mr. PINCHOT. No. What we do is simply based on this fact, that we can not save the forests of this country unless the people who own timber lands themselves are in favor of practicing forestry. We shall never have anything like a half or a third of the timber lands of the country under Government ownership. Forest preservation is therefore dependent on general, popular knowledge of forestry. So we are trying to call attention to forestry and the need of forestry through the press as widely as possible. The way we do it is to describe actual pieces of work that are going on.

I will read you a few of the titles of these articles: "Growth of forestry in seven years;" "Forest management in West Virginia;" "Nine 'don'ts' for wood-lot owners;" "For protection of Washington forests;" "Tree-planting clubs for staked plains;" "Grazing fees on reserves upheld;" "Army posts apply forestry;" "Strength tests of timber at the mill;" "How the Forest Service has brought the testing machine to a South Carolina sawmill;" "Forest belts of western Kansas and Nebraska;" "Forest planting in northeastern Pennsylvania;" "Great structural timbers of the Pacific coast;" and so on.

Mr. SCOTT. Have you found those articles are used generally by the papers?

Mr. PINCHOT. They are quite generally published. They are written by a man who has been in the newspaper service, and who spends most of his time at that work.

The newspaper men come in every morning and ask for material, and this man is assigned to the task of getting together what they ought to have and giving it to them. The other two men are employed in editing the publications we send out.

Mr. SCOTT. Does that man get \$10,000 a year?

Mr. PINCHOT. The press-bulletin man gets \$1,500 and the man who has charge of the whole thing gets \$2,200. I am interested in this because Senator Heyburn made a statement the other day that the Forester was maintaining a press bureau for the sake of exploiting himself. I wanted you to see just how this thing is being done.

The CHAIRMAN. Just explain to the committee the need of this rent in the next item, which reads as follows:

And for the purchase of all necessary supplies, apparatus, and office fixtures; for freight and express charges, and traveling and other necessary expenses, nine hundred and eighteen thousand and forty (seven hundred and ninety-three thousand one hundred and eighty) dollars, of which sum not to exceed twenty-five thousand dollars may be used for rent.

Mr. PINCHOT. When we began eight years ago we had three rooms in the Department of Agriculture.

The CHAIRMAN. What was your first appropriation?

Mr. PINCHOT. Twenty-eight thousand five hundred and twenty dollars; but you raised it the first year to \$40,000 and over.

The CHAIRMAN. It has been a raise every year until you reached a million dollars, but that is counting the expenses of the forest reserves, which you did not have until this year.

Mr. PINCHOT. Yes, sir.

Mr. HENRY. Where are your quarters?

Mr. PINCHOT. They are at 930 F street, in the Atlantic Building. We have something over four floors of that building.

Mr. HENRY. Just tell about where you started, and what has caused the necessity for this rent.

Mr. PINCHOT. Pretty soon we outgrew the three rooms in the Department of Agriculture, we could not live in them longer, so we hunted and finally found two floors in the Atlantic Building vacant. We got them for 25 per cent less, including a little more space, than the Indian Office had been paying, and with a contract that we could have as much more space as we wanted in the Atlantic Building at a reduction below the market price for the space. We are now occupying about five floors, and we may soon have to take the whole building, which we have the right to do under the contract.

The CHAIRMAN. In other words, the Department had outgrown the old building, and we had to rent buildings until the new building is completed. When the whole new building is completed you can go into that building?

Mr. HENRY. The two "Ls" will not give you room?

Mr. PINCHOT. No. Now, as to Mr. Davis's question. I think every boy and girl who graduates from an agricultural school or comes in contact with the agricultural experiment stations ought to have some definite knowledge of forestry. Botany is taught in many schools; why not forestry? If the rural population, through the experiment stations and the colleges, can be taught forestry—not professional forestry, but such forestry as a man needs to handle his own wood lot—one of the most useful possible things will have been done. I have always been enthusiastic about forestry, but the longer I work on it and the more I see of the relations of forestry to the different industries, and especially to agriculture, in the United States, the more thoroughly I am impressed with the absolute necessity of saving the forests of this country if we are to go on with our present growth, or even if we are not to meet with a decided check in our growth. There is not an industry in the country that is not tributary to the forests in some way or another, and yet instead of our forests being saved the consumption of them is being increased rapidly and steadily.

Mr. BROOKS. As I understand it, the idea of the Department in preserving the forests is not to preserve specific trees?

Mr. PINCHOT. Not at all.

Mr. BROOKS. But to make them commercially available to meet the demands for lumber?

Mr. PINCHOT. That is it.

Mr. BROOKS. I think there is a good deal of the opinion that forestry means the preserving of individual trees.

Mr. PINCHOT. Yes; that is, unfortunately, so.

Mr. COCKS. There is an idea which is very widespread that the object of forestry is to keep the ax entirely out of these reserves.

Mr. PINCHOT. Yes. We have a constitutional amendment in New York which keeps the ax entirely out of a State forest. That is absolutely foolish.

Mr. COCKS. And the so-called friends of the forest there have an idea that it is to be left absolutely alone and that there is to be nothing done to it.

Mr. PINCHOT. Yes. I care nothing about any forest that is not used.

Mr. DAVIS. Along the line that you have suggested, that you can not carry on successfully your national forest work unless the private forest owner is interested also, do you not think that the Government would do very well to encourage in the existing institutions the study of forestry?

Mr. PINCHOT. I do.

Mr. DAVIS. So that when they leave those institutions the young men and women might be pretty well posted along this particular line?

Mr. PINCHOT. Yes.

The CHAIRMAN. And give the service a moral support, even if they do not take any active interest in it?

Mr. PINCHOT. Exactly.

Mr. DAVIS. And that the Government of the United States ought to make a provision along that line, and that it would be extremely useful?

Mr. PINCHOT. Yes; I think it would be.

Mr. DAVIS. And encourage an industry that you are very much interested in; and I think the majority of the people of the United States will soon become very enthusiastic over it.

Mr. PINCHOT. I think so.

Mr. DAVIS. This is not asking for anything for the "downtrodden farmer," he can take care of himself, as a rule; but it is asking for something that the whole people of the United States are interested in, the preservation of our forests.

Mr. PINCHOT. That is very much so. Of course the preservation of any particular piece of forest does not concern the owner of it alone, but it concerns the public also.

Mr. DAVIS. I have a measure that I have introduced before this committee. I do not know whether they will pass it or not, but it is for the purpose of the Government providing money for every one of the agricultural colleges who have any knowledge, or teach anything, concerning forestry, and particularly for the experiment stations. The matter has been referred to your Bureau, and I think we have a very favorable recommendation on the bill.

Mr. PINCHOT. You certainly have. I agree with it decidedly, and I hope it will be done.

Mr. DAVIS. I was only waiting until I got a little more information before I called the matter up before the committee. I am very glad that you came up this morning.

The CHAIRMAN. Is there anything further you want to say on the general subject? We would be very glad to hear you for ten or fifteen minutes longer.

Mr. PINCHOT. May I say a word about the general organization of the Service?

The CHAIRMAN. Certainly.

Mr. PINCHOT. We are trying to change what has been the usual Government way of doing work, which has been to omit field inspection and depend on reports, and to keep the field force and the office force entirely separate. Now, the Forest Service is trying to see that every man in the field knows something about what is going on in the office, and every man in the office is thoroughly familiar with the field work. Every man who has to decide in the office a question in relation to forest reserves in the Forest Service knows about reserves from personal experience, and he usually knows about the particular reserve in question. Further, everything that can be safely left to the man in the field is taken away from Washington and given to the man in the field to decide. We keep in touch with the field man by field inspection, which is the key to our whole system. In other words, I propose that the Forest Service shall know a man not by what he says about his own work in reports, but by what a competent man says in regard to that work, who has actually seen it at frequent intervals, and that every man in the field shall have at least as much responsibility as he can properly handle.

The cases that have come to my knowledge of mistakes made by giving young men too much responsibility are very few. Give young men responsibility and in ninety-nine cases out of a hundred they will rise to the demand and do well. What we are proposing is to give men responsibility, then to lay the first stress on inspection, and do away with the paper work just as far as possible. We have reduced the routine paper work, since the reserves came over from the Land Office, at least one-half.

The CHAIRMAN. What you mean by "paper work" is letter writing?

Mr. PINCHOT. Letter and report writing, and the preparation of various papers that have to be filled out.

Which reminds me that we are constantly revising all our methods of doing business with the object of reducing red tape. I have a very good man whose constant business it is to keep examining the routine methods by which we proceed and to make suggestions. Every now and then we find something that can be done better than in the old way, and the prospect of change keeps us from getting into ruts.

The moment you stop changing your methods for the better you begin to go the other way. The price to be paid for short, compact methods of doing the routine work is constant revision. That is now going on, both in the office and in the field.

The CHAIRMAN. I think that stenography and typewriting has done more to increase verbosity than anything else. If you had to write out everything that was done in longhand in the old way, there would not be so much of it done.

Mr. PINCHOT. In the old days every letter that went to the field in the forest reserves service had in it (as is still the case in many Government offices) a repetition of the letter to which it was a reply. The substance of the letter is repeated, and then the answer is made. I have seen many letters with two pages of repetition and at the end a line or two to say that the request is denied. I think it is fair to say that the vast majority of the letters which go out from the Forest Service now are not over ten lines in length. We begin, "In reply to your letter of such a date," and then say what we have to say and stop.

We have applied every part of the Forest Service to the problems of the forest reserves, and the reserve work has been incorporated in the old bureau of forestry without interrupting its work or changing its organization. We knew that the care of the reserves was coming. We got ready for it, and the organization was entirely equal to the task when it came.

I do not want to keep you any longer, and I do not think there is anything else I have to say, except to thank you.

The CHAIRMAN. Nothing else?

Mr. PINCHOT. I think that is about all of it.

(Thereupon the committee adjourned until Monday, January 29, 1906, at 10.30 o'clock a. m.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Monday, January 29, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

**STATEMENT OF DR. HARVEY W. WILEY, CHIEF OF THE
BUREAU OF CHEMISTRY.**

The CHAIRMAN. Doctor, we will take up your statutory roll first. I see you have increased the salary of the chief of the Bureau \$500. I suppose that you will not want to say anything about that?

Doctor WILEY. I do not want to oppose it, Mr. Chairman. I naturally feel a modesty in speaking about that.

The CHAIRMAN. Then you submit an increase of \$200 in the salary of your chief clerk. Why do you increase his salary?

Doctor WILEY. The lowest priced chief clerk in the Department is the one that I have, and I do not know of any bureau where there is more work for a chief clerk to do. It seems that they ought to be placed on something like a parity.

The CHAIRMAN. This parity is always up and never down.

Doctor WILEY. Never down. I do not want anybody brought down, Mr. Chairman.

The CHAIRMAN. How long has this man been there?

Doctor WILEY. Since the Bureau was organized. It has been three or four years, I think.

The CHAIRMAN. Was he in that division before that?

Doctor WILEY. Yes, sir.

The CHAIRMAN. How old a man is he?

Doctor WILEY. The chief clerk is not a man, but a woman, the only woman chief clerk in the service of the Government.

The CHAIRMAN. How long has she been there?

Doctor WILEY. She has been in the Bureau nineteen years, and is a very faithful and efficient employee, and thoroughly acquainted with the necessities of the Bureau and its clerical work, which is very complicated and difficult; more so than in most bureaus.

The CHAIRMAN. The next item is "Three clerks of class 1 (increase of one submitted)." Why do you ask for that additional clerk?

Doctor WILEY. We need an additional clerk. We do not want to put any clerk on the lump-sum roll, and we need this increase of the clerical force.

The CHAIRMAN. Is that a \$1,000 clerk? These three clerks are at a thousand dollars apiece?

Doctor WILEY. Class 1 is the \$1,200 class. We want one additional clerk in that class. We want, of course, to promote from the lower service, and we want another clerk of that salary, to make room for the additional clerk down the line.

The CHAIRMAN. How about the library clerk?

Doctor WILEY. That is a young lady in charge of our library, which is a most important part of our work.

The CHAIRMAN. Is not that library a part of the main library?

Doctor WILEY. It is under the charge of the main library, of course?

The CHAIRMAN. You are accountable for the books?

Doctor WILEY. Yes, sir; but all purchases, and all that sort of thing, belong to the main library.

The CHAIRMAN. As I understand, each bureau, practically takes what books it wants from the main library?

Doctor WILEY. They do at the present time, on account of the scattered condition of the bureaus. They are scattered all over town, you know. To have all the books in the central library would be impracticable.

The CHAIRMAN. I was wondering how much was left in the care of the central library after all the bureaus took out such books as they wanted. They are asking for more help in the central library.

Doctor WILEY. I do not know as to that. I am only asking for my own work.

The CHAIRMAN. Now, you ask there for another bookkeeper.

Doctor WILEY. The property of our bureau, Mr. Chairman, is more complicated, and we have to buy more separate items, and keep track of them, more than in almost any other part of the service. As you will see from this itemized statement of expenditures which has been prepared we buy about \$29,000 worth of material a year, and we have to keep track of hundreds and hundreds of bills. Our present clerk, who acts as property clerk—Mr. Linton—is most efficient, and he is working very much overtime and needs very much an assistant.

• The CHAIRMAN. This bookkeeper is to be an assistant to whom, the library clerk?

Doctor WILEY. No, sir; to the property clerk.

The CHAIRMAN. There is no such title as that on the list, I believe.

Doctor WILEY. No, sir. Mr. Linton is a \$1,400 clerk.

The CHAIRMAN. He is doing that work now?

Doctor WILEY. Yes. He needs an assistant in that work.

The CHAIRMAN. The property clerk; he is doing that work now?

Doctor WILEY. Mr. Linton is doing that now, but that is not his title.

The CHAIRMAN. What salary is he getting?

Doctor WILEY. One thousand two hundred dollars. "One property clerk." That is not Mr. Linton; that is his assistant.

The CHAIRMAN. Where is Mr. Linton under this list in the estimates?

Doctor WILEY. I think he is one of these two clerks. He is now getting \$1,200. He is under this item of "Three clerks of class 1 (increase of one submitted)." There are but two now.

The CHAIRMAN. Those are \$1,200 clerks?

Doctor WILEY. One thousand two hundred dollar clerks.

The CHAIRMAN. You propose to take one of those clerks? You create a new place—two new places?

Doctor WILEY. This clerkship is a new creation.

The CHAIRMAN. The bookkeeper is a new creation?

Doctor WILEY. Yes, sir; the bookkeeper is a new creation.

The CHAIRMAN. You say the bookkeeper is to be an assistant to the property clerk?

Doctor WILEY. An assistant to the property clerk; yes, sir. Then we have this one additional clerk in class 1. We have submitted for three new clerks on the statutory roll.

The CHAIRMAN. Three new clerks; that is right.

Doctor WILEY. One, Mr. Linton, who is now getting, I think, \$1,400, perhaps. I think Mr. Linton is one of those two clerks of class 2, at \$1,400. We have three new positions—one property clerk, which will take one of the two clerks of class 2 and leave a chance to promote one of the two clerks of class 1, and that makes three altogether.

The CHAIRMAN. You ask for three new places?

Doctor WILEY. Yes; for three new places on the statutory roll in the clerical service.

The CHAIRMAN. Two increases of salary and three new places?

Doctor WILEY. Yes, sir.

The CHAIRMAN. From what fund were these men paid last year?

Doctor WILEY. Mr. Linton is one of the clerks of class 2. I have found where he is now in the bill. He is one of those clerks of class 2, getting \$1,400 now. The property clerk we have not at all now. To Mr. Linton is assigned a young man, however, who is a clerk now getting \$1,000 a year from the lump fund.

The CHAIRMAN. Yes.

Doctor WILEY. And my plan would be to take this young man who is very competent and put him on the statutory roll if you give me the new clerk and bookkeeper.

The CHAIRMAN. What is he getting now?

Doctor WILEY. \$1,000. He has been assisting Mr. Linton during the past year.

The CHAIRMAN. The next is "Three messengers or laborers, at \$480 each (increase of one submitted)." Why do you want another laborer or messenger?

Doctor WILEY. We have a great deal of manual labor around our Bureau. The character of our work is such—there are so many different things to attend to, so much transportation, and the work is so difficult in the basement, for instance, to keep things clean—that one of the men is occupied practically all the time in keeping things clean, and another man is practically occupied all the time in unpacking boxes that come to us, and we have a very large demand for labor of that kind.

The CHAIRMAN. You are not going to get for \$490 a man capable of packing and unpacking and doing other work of that sort, are you?

Doctor WILEY. Probably not. There is additional work which he can do. We have a very large amount of work.

Mr. HENRY. You are expecting to move into the new building, are you not?

Doctor WILEY. That was the idea, but I doubt if we get into that very soon.

Mr. HENRY. I supposed your Bureau would move in there.

Doctor WILEY. I do not know what the plan is.

Mr. HENRY. When you move into the new building will you need laborers as much as you do in your present place?

Doctor WILEY. We would need just as much labor in taking care of our apparatus.

Mr. HENRY. But you would have your work better systematized?

Doctor WILEY. Yes.

The CHAIRMAN. You will not need an engineer when you get into the new building?

Doctor WILEY. No, sir; we will not need an engineer. That is one thing that we would not need in the new building. Nor would we need a fireman.

The CHAIRMAN. What are these "two messengers or laborers, at \$420 each?"

Doctor WILEY. One is a charwoman and one a messenger boy.

The CHAIRMAN. You have three messengers and laborers, at \$480 each, and two messengers or laborers, at \$420 each.

Doctor WILEY. Three of these are charwomen, one is a messenger, and the new place is for the laborer above mentioned.

The CHAIRMAN. Let us take up the items under the laboratory. Have you the bill before you?

Doctor WILEY. Yes, sir.

The CHAIRMAN. The first item is: "To continue the collaboration with other bureaus and divisions of the Department desiring chemical investigations and to collaborate with other Departments of the Government whose heads request the Secretary of Agriculture for such assistance, and for other miscellaneous work." Just tell the committee what you are doing under that clause, please.

Doctor WILEY. We are collaborating with the Bureau of Plant Industry in the study of cereals. We are doing all the chemical work in collaboration with them in their cereal investigations.

The CHAIRMAN. That comes below, I see, under another paragraph. I think this paragraph might be recast and simplified and shortened a good deal.

Doctor WILEY. I suppose you refer to the item: "To study, in collaboration with the Weather Bureau, the Bureau of Plant Industry and agricultural experiment stations, the influence of environment upon the chemical composition of wheat and other cereals, with especial reference to the variation in the content of gluten?"

The CHAIRMAN. Yes.

Doctor WILEY. That is work that we are doing. We put this in here at the request of the Bureau of Plant Industry, this time. It is not a new thing. This authority has been in the Bureau for many years, and we have done a lot of work under it. As we are now collaborating with the Bureau of Plant Industry, they suggested that we insert the name of that Bureau, which we have done. The first paragraph you have read is more in connection with other Departments of the Government. I will explain to the committee in a few moments the nature of the work we do.

With the Treasury Department, in addition to the inspection of foods which we do in collaboration with them, they submit to us all questions where there is a difference of opinion on certain articles for duty. If their own chemists come to the conclusion that there is something questionable as to the classification of articles of food, they constantly refer those questions to us, and usually they will abide by the decision of our Bureau. We give our opinion as to how they should be classified for dutiable purposes. We have a good deal of that work to do in addition to our inspection work, which I will take up later under the head of "Inspection."

With all the Departments we do a great deal of work for what we call "contracts"—materials which are bought by the Departments under specifications requiring certain chemical and physical properties—and that work is growing constantly. Under the law the heads of the Departments can ask the Secretary of Agriculture for assistance in these cases.

Mr. BROOKS. Right there let me ask you one question. Is that in the organic law incorporating the Department of Agriculture?

Doctor WILEY. In the establishment of the Department?

Mr. BROOKS. Yes.

Doctor WILEY. No, sir; I think not.

Mr. BROOKS. Was there a special act giving the Department of Agriculture power to make these investigations for the other Departments?

Doctor WILEY. No other act but the appropriation bill, so far as I know.

Mr. BROOKS. Then this power given to the Bureau of Chemistry is found in this appropriation bill?

Doctor WILEY. Yes, sir.

The CHAIRMAN. The whole Department has practically been built up by the appropriation bills from this committee?

Mr. BROOKS. Yes; I know. That question has arisen in the other Departments in a very interesting way, and I wondered if there was anything in the act establishing this Bureau different from what is in the acts establishing the other bureaus.

Doctor WILEY. I do not think there is anything in the act.

Mr. BROOKS. I see no reason why any of the Departments can not call on the others for information.

The CHAIRMAN. There is no reason why they should not, whenever necessity arises.

Mr. BROOKS. No.

Doctor WILEY. They were constantly doing this without authority of law, and they often gave us burdens very difficult to carry under the funds we had, and this was put into the bill a few years ago to show to the committee why we needed some additional help to carry on work of this kind, and since that time these Departments have increased very much the number of questions of this kind that they submit to us. For instance, the Commissary Department of the Army submits questions to us continually. We do work for them in the examination of foods submitted to the Army, and we make examinations of materials submitted to them for uniforms, and leather for harness. The Departments submit for our opinion many questions which formerly they did not submit to us. The State Department submits to us the papers and the inks they use for their records. The Post-Office Department submits to us the canceling inks and the stamps, to see whether the cancellation can be erased and the stamps used again. The Post-Office Department also calls on us for work in regard to these "fake" medicines, on the question as to whether they are fraudulent in their character. Every bit of that we do.

There is not a single one of the Executive Departments for which we do not have work. Those I have mentioned are the ones that we do the most for. Our entire laboratory in our Bureau is occupied all the time with that collaborative work. I think that is of the greatest possible advantage to the Government to have that done. That is the signification of that clause.

Then, we cooperate with practically all of the bureaus and divisions of the Department of Agriculture in their work. Some of them have their own independent laboratories, which, of course, I do not think is the best arrangement, but it has been so established; and, of course, with that we have nothing to do; but others call upon us constantly for service of this kind. The Bureau of Forestry and the Bureau of Plant Industry and the Bureau of Entomology have our help.

For the Bureau of Entomology we make examinations of insecticides, and so forth. We are doing a lot of work for the irrigation service in studying the character of the waters which they propose to use and of the materials which they may contain which may prove injurious to vegetation. In fact, a good part—quite a large part—of our force is utilized in doing the work generally for the other divisions and bureaus of the Department of Agriculture as well as the other Departments of the Government. I suppose I might say that 20 per cent of our work is done under those clauses.

The CHAIRMAN. The next is "For the employment of additional assistants and chemists when necessary."

Doctor WILEY. That has been in the bill since the formation of the Department. It was, I think, in the first appropriation bills.

The CHAIRMAN. Yes; I know that. Do you often have to employ emergency chemists?

Doctor WILEY. Yes, sir. I can tell you three or four that we are employing now under that very clause. There are often special investigations which a certain person can do which we can get done by employing that person for a short time better and more economically than any other way. We have now one man examining into the chemical changes that take place in canned goods, Doctor Bittings, of Purdue, in Indiana, situated right in the region where that industry flourishes, and we can get better results by employing him for short periods than in any other way. Then, Doctor Pennington, in Philadelphia, is working on the changes in canned milk. These are persons having special qualifications for the different branches of work they are doing, and we employ them under this clause.

The CHAIRMAN. You employ them temporarily?

Doctor WILEY. Always temporarily.

The CHAIRMAN. They have not sort of crept on to the roll and stayed there?

Doctor WILEY. No, sir. We never have any of that kind. They are employed for special service and then stop. If they come for any length of time, they have to be certified from the Civil Service Commission after passing an examination. None of them as yet have ever been employed for longer than six months at a time.

Mr. DAVIS. About what is the salary or the compensation that you give them?

Doctor WILEY. To these special chemists?

Mr. DAVIS. That you employ three months?

Doctor WILEY. We employ them usually at the rate of about \$2,000 a year for the time they give us. We sometimes employ them simply by the day, and they certify to the number of days they work. We have now one chemist in Boston, Doctor Woodward, who is connected with the Institute of Technology, who is employed by the day. In the service there in the port of Boston our own people frequently have such a rush of inspection that they can not do it, and they send for Doctor Woodward, and he goes down there and helps, and they certify to the number of days he is employed, and we pay him at the rate of \$7 a day. We have four or five under that clause who are working for us at the present time. Sometimes we have none.

Mr. DAVIS. What is the bulk or lump sum that you have disposed of for special employment of that kind?

Doctor WILEY. I have prepared here a statement of all of our itemized expenditures for the fiscal year just ended, so that each member of the committee may have a copy of this before him.

Mr. DAVIS. I would be obliged to you if you would just state what the lump sum was that was at your disposal for this special hiring?

Doctor WILEY. One hundred and thirty-four thousand eight hundred dollars for the fiscal year ending June 30, 1905.

The CHAIRMAN. How much have you employed under that clause for the employment of additional assistants and chemists, when necessary. That is what Mr. Davis wants to know.

Mr. DAVIS. And how much was at his disposal for that?

The CHAIRMAN. That is a matter of apportionment in the Department. They have a lump sum, and they apportion it. The lump sum last year was \$134,800.

Doctor WILEY. From my knowledge, without going into details, I

can answer the question approximately by saying that we spent, I think, \$5,000 under that clause which is now under discussion.

The CHAIRMAN. You mean under this clause for emergency chemists, as you might call them?

Doctor WILEY. Yes, sir.

Mr. DAVIS. There are others that you employ in an emergency capacity?

Doctor WILEY. No, sir; that is the total emergency expenditure. This year it will be a little more, because we have employed one or two more people than last year.

The CHAIRMAN. The next item is "For the rent of buildings occupied by the Bureau of Chemistry."

Doctor WILEY. That will be the same for the next year, so far as we know, as it is for the present fiscal year, \$2,800.

The CHAIRMAN. Please state the reason for that.

Doctor WILEY. We have, of course, no building at all. Our laboratory has been separate from the main building for sixteen years. We lease these three buildings which we occupy—the large building and two small storehouses attached to it. The large building we pay for at the rate of \$2,500 a year, and the other two small buildings we pay \$300 for, making it a total of \$2,800. I think we have asked for a little increase on that, have we not? Is there an increase of the rental this year?

The CHAIRMAN. You have asked for an increase of \$32,000—a lump-sum increase of \$32,000. I do not know how you apportion that.

Doctor WILEY. Rental is not a statutory provision, then, is it?

The CHAIRMAN. No, sir. The next item is "To investigate the adulteration of foods, condiments, beverages, and drugs, when deemed by the Secretary of Agriculture advisable." What have you done in regard to that along those lines? Right in that connection tell us, first, how much money you spent, about, for that. What is your apportionment for that from the lump sum? Just refer right to your table there.

Doctor WILEY. Of course the itemized expenses do not show what has been spent particularly for that, except in the materials which have been bought and salaries paid. Those will amount to \$77,782 in the ports and in Washington. I should say that in the investigation of the adulteration of foods, and so forth, we have spent in salaries and in supplies, which are mentioned below, between \$15,000 and \$20,000.

The CHAIRMAN. In round figures?

Doctor WILEY. Yes, sir.

The CHAIRMAN. Tell us what work you have done along these separate lines.

Doctor WILEY. Do you mean in our food work, or our investigations of foods?

The CHAIRMAN. You might take it up in the order given in the items. It says here, "foods, condiments, beverages, and drugs."

Doctor WILEY. In foods, wherever we think there has been adulteration practiced, we study the character of the adulteration, the methods of detecting it, and the effects upon the nutritive value of the food products. So that we have three different classes of investigation in this line: First, to determine the character, as to the effects

produced in the food products; second, analytical methods; and third, the effects which those products produce upon the consumer. These are studies of composition and nutrition, and the chemical studies detecting the substances used as adulterants and the substances which have been subtracted from the foods. The third class of investigation is pharmacological tests, feeding the lower animals and also man these adulterated food constituents. We have now a dog and rabbits under observation, and also some young men who are eating these foods.

Work of that kind is expensive, although we think we do it economically. It requires a lot of work in the control of the food and the excreta, and we have about 20 chemists employed in that work, most of them young men not receiving large salaries, and that is the reason that the expense is not greater than it is; and we think it is a very important work in agriculture and nutrition, because nutrition and agriculture are so related that you can not separate them. We believe that agriculture will be benefited by the absolute purity of the products, and that the moment the farmer's products are adulterated in any way the farmer is injured as well as the consumer. So that we believe this work is for the good of the consumer first, and of the farmer in the second place. This is the most expensive of any one of our investigations, with the possible exception of the investigations of imported foods.

The CHAIRMAN. What adulterants have you found in foods that were injurious to health, so far?

Doctor WILEY. We have found that practically every substance of an antiseptic nature which is added to food is injurious. It impairs the nutritive value of the food and acts specifically upon the consumer in an injurious way. We began with borax and boracic acid, and proved exclusively that those things, even in small quantities, when consumed over a long period of time are distinctly injurious to health.

The CHAIRMAN. What are those used in?

Doctor WILEY. Mostly in preserved meats.

The CHAIRMAN. Do you mean in canned meats?

Doctor WILEY. No, sir; not in canned meats. Nothing need ever be put in canned meats, because they are sterilized; but in smoked and salted meats.

The CHAIRMAN. In shipped dressed beef? In dressed meat that they ship over the country from packing houses?

Doctor WILEY. They are used extensively in meats intended for export and in sausages particularly, and in smoked and dried fish, and in meats of that description. Borax in the quantity used is tasteless and odorless, so that the consumer has no idea of its presence. It therefore can be used instead of salt, which is the old way of curing meats and fish. The old-fashioned ways of preserving were with salt and smoke and sugar and vinegar and by dessication, and these are harmless methods of preserving meats; but borax can be used instead of those methods, and it has great advantages from the manufacturers' point of view, but it makes the meat far less palatable and, at the same time, far more injurious to health.

The CHAIRMAN. I understood you to say that borax and boracic acid are only harmful after prolonged use.

Doctor WILEY. No, sir. Of course one dose of borax will not hurt anybody. It is beneficial at times. It is a medicine, and a man may

be in a condition where such medicine helps him; but that is no reason why medicine should be put in food.

The CHAIRMAN. No.

Doctor WILEY. And we found where young men were fed $7\frac{1}{2}$ grains of borax a day for fifty days that they lost flesh and they lost their appetite and their ability to work. They lost all inclination to work, and, while they were not poisoned so as to be sent to bed, they were injuriously affected in these ways.

The CHAIRMAN. You say they lost their inclination to work?

Doctor WILEY. Yes, sir; they lose in their ability and in their inclination to work.

Mr. FIELD. Is this used in the preservation of fresh fish and oysters?

Doctor WILEY. Yes, sir. It has been used extensively in the shipment of oysters—in open shipment, tub oysters, sent West—but I think not to such a great extent at the present time.

Mr. FIELD. On fresh fish, too?

Doctor WILEY. Probably it was; but so far as our investigations are concerned, we found it only on salt fish. With salicylic acid we made an investigation, and we came to the same results. Sulphurous acid and sulphites are also used. Sulphites are used in fresh meats. They give a very bright color to the meat, and we have never yet examined a sample of hamburger steak, such as we find in our markets constantly, that was not dosed with sulphites. We had a case under the Pennsylvania law where a butcher was tried for putting sulphites in meats. My friend Doctor Liebreich, of Berlin, a very eminent chemist, who believes in the use of preservatives in foods, came all the way over here to testify in this case, and he is a man of the greatest reputation and ability and perfectly honest in his belief. He went onto the stand and testified that in his opinion sulphites were not injurious. He was asked, on cross-examination, whether he ate meats containing sulphites. He said, "No; I do not." When they pressed him as to why he did not, he said that he did not like them, and did not want to eat them. We sent up to testify one of our boys who had made these analyses—they wanted me to go, but I could not—and they put him on the stand, and he testified to the facts that I have stated to you, and they brought in a verdict against the butcher. So that the boy, who was on the right side of the case, had more weight than this very eminent man who was on the wrong side of the case.

The CHAIRMAN. That was an American jury, was it not?

Doctor WILEY. Yes, sir; of course. We have made very extensive experiments with copper sulphate, which is used so extensively in green vegetables, very extensively in Europe (and also, to a limited extent, in this country), as shown by the beautiful French peas you get, and the beans and spinach; and when I went into the French factories this last summer, when I was making a study of the methods of preparation of foods for exportation to this country, they showed me every step they took. They said, "Well, you are here, and we might as well show you everything;" and so they opened the doors and went with me and showed me how everything was done. This material that we found in these foods, used any considerable length of time, has a distinctly injurious effect on the health of the consumer.

The CHAIRMAN. That is sulphate of copper?

Doctor WILEY. Sulphate of copper in those.

The CHAIRMAN. I presume you refer to those French peas that have such a pretty green color?

Doctor WILEY. Yes, sir; everything of that kind—all those vegetables. I will say, in behalf of our own packers in this country, that the use of copper is not at all common with them, and what little there has been, perhaps, is now going out of use because the packers themselves are convinced that it is a substance which is injurious to health, and those few who did use it have stopped it. Naturally, you will find the American peas are yellow in color and not green. I take the ground that we had better have something that is not quite so pleasing to the eye, perhaps, but that will not injure the health. The copper sulphate destroys the flavor, and the peas or beans taste metallic, and the only thing the addition of the copper does is to make them look green. We have proved that that substance, when added to foods, is injurious to health.

We have done the same thing in regard to formaldehyde. It was hardly necessary to do that, because everybody admitted it. That is, formaldehyde is formed from wood alcohol, and that aldehyde would necessarily be more injurious than that formed from common alcohol. Formaldehyde is very valuable as an antiseptic; it is splendid for destroying germs anywhere; but it is something which should not enter into food.

We found something entirely new, and that is that it had a specific decreasing influence on the temperature of the human body. We have very delicate thermometers, which were used in our experiments, and we took the temperatures, but they were not added up during the preliminary experiments, and I did not notice that particularly until we came to formulate the final results, and then I found in almost every case during the administration of formaldehyde there was a lowering of the temperature. It stops the oxidation in the body and injures the health, of course.

The CHAIRMAN. What is that preservative used for?

Doctor WILEY. It was formerly used in milk, and undoubtedly is yet to a large extent where there is no supervision.

The CHAIRMAN. As a preservative?

Doctor WILEY. Yes; it is added to the milk to preserve it. A few drops of formaldehyde put in milk will make it keep for three months, even in hot weather. It is almost a specific poison for a child. That is one thing that I want to impress on this committee, because there is going to be a tremendous effort made by the adulterators of this country to knock out this authority which you have given us to make these investigations, because we are disturbing our friends (?) very much, and there is an effort, as you have seen it this morning,* to prejudice people against our work and against the standardization—fixing the standards which we can go by.

The CHAIRMAN. That is, fixing the standards in every State, so that every State will have the same standards?

Doctor WILEY. Yes, sir; when they adopt them. Now, we have also studied the effect, under this same authorization, of storage upon

* Referring to an anonymous communication urging opposition to the pure-food bill.

the ripening of fruits. We have made some useful determinations there which are going to be of immense advantage to our orchard men and those who keep fruits in cold storage. We have found how long the fruit will improve when stored. That is one of the things that improves in cold storage. After a few months an apple reaches perfection, and we have traced the progress of the decay of fruits. That is one of the things we have done in the first year, and our work will prove of immense benefit.

The CHAIRMAN. Will not that vary a great deal with the time of picking, and all that?

Doctor WILEY. Yes, sir. The Bureau of Plant Industry is doing that part of the work and we are doing the chemical work, and we have each issued two or three bulletins on the subject.

That is a brief outline, without going into details, of the character of the work we are doing under this provision, which I think is work of great importance.

The CHAIRMAN. Now, in regard to condiments, what have you done? I saw something in the newspapers the other day about Lea & Perrin's Worcestershire sauce. I believe.

Doctor WILEY. Yes; I am glad you mentioned that—Lea & Perrin's sauce, as it is named on the label. As a matter of fact, no Lea & Perrin's sauce is imported; it is all made here, but is incorrectly labeled.

We have no control over that, but the State of Minnesota passed a law in which they specified that foods which contain salicylic acid can not be sold in that State. They informed the manufacturers, John Duncan's Sons, in New York, that they could not sell that sauce, containing salicylic acid, in the State of Minnesota, and they must take out what they had. The manufacturers wisely accepted that law and immediately went to work, and they are now making the same sauce, that tastes even better than the old sauce, without adding anything at all to it in the way of a preservative. That shows what a good law can do.

Mr. BOWIE. In other words, the salicylic acid was not a necessary ingredient?

Doctor WILEY. No, sir.

Mr. BOWIE. What was the reason they put it in the sauce?

Doctor WILEY. It makes it cheaper to manufacture. They can put salicylic acid into any old thing and it will keep; and it saves money in sterilization. But it is not necessary to use it in any of these food products.

Mr. BOWIE. Is it necessary to use it to any extent in beer?

Doctor WILEY. I do not think you could find much beer in the United States that has any salicylic acid in it. It was formerly used extensively. They do use sulphurous acid and sulphates, which I think are objectionable also, but not much salicylic acid, so far as our investigations have revealed.

Mr. BOWIE. Do you think it is as objectionable as salicylic acid?

Doctor WILEY. I think it is, but it is not so much objected to. But there is a peculiar question about sulphurous acid which makes it very difficult to handle it in any physiological way, viz, its very general use in the preparation of food products, such as evaporated fruits, wines, etc.

Mr. BOWIE. What condiments have you examined?

Doctor WILEY. The only condiments we have examined are the spices, peppers, common salt, wood smoke, and vinegar. Now, we consider all those are wholesome, and for this reason: Digestion is a process, as you know, which is carried on by the secretion of ferments in the intestinal canal, and the condiment is nature's method of exciting the secretory glands. You take any food and add to it nature's natural condiments and you have a free flow of the secretory glands. For instance, you say that the "mouth waters" when you think of something good to eat, and when you are hungry the smell of food makes the mouth water: it excites the glands. The smell itself becomes a condiment there, because this sort of an odor is condimental. The committee which the Secretary is authorized by Congress to employ is almost ready to publish its standards for these condiments. That is one of the great works of the past year.

The CHAIRMAN. About vinegar, what have you done in regard to that? It is said that there is a lot of vinegar sold which is advertised as cider vinegar which is not cider vinegar at all.

Doctor WILEY. We have fixed a standard on the basis that vinegar shall mean the common vinegar of the country. In France the vinegar is made from wine, and French vinegar we say is made from wine. In England vinegar is made from malt, and we say that English vinegar is malt vinegar. In this country vinegar without any classification at all is cider vinegar. We have fixed those three standards, and we have fixed a proper standard for cider vinegar, which is now being adopted by the States and is in harmony with most of the State standards, although differing from some of them. That is a very important question. In the importations to this country we are excluding a great deal of the vinegar that is not up to these standards. We do not consider that the vinegar made from distilled alcohol comes under any one of these classes. We would say that that is distilled or spirit vinegar. We find that a lot of French vinegar is distilled or spirit vinegar, and we send it back unless it comes properly labeled.

The CHAIRMAN. Have you heard any complaint that a lot of the vinegar that is sold as cider vinegar is not cider vinegar, but is adulterated?

Doctor WILEY. There is considerable of it sold where the laws are not uniform.

The CHAIRMAN. Have you run across any of that?

Doctor WILEY. A great deal of it.

The CHAIRMAN. Have you advertised any of the sellers?

Doctor WILEY. No, sir; we have not.

The CHAIRMAN. There is a great deal of complaint about that.

Doctor WILEY. Yes; I know there is.

The CHAIRMAN. About adulterated vinegars?

Doctor WILEY. Yes; and it is a very just complaint.

The CHAIRMAN. Where they are selling something as cider vinegar which is not cider vinegar, under this act here you could advertise them as you did some of these other fellows, could you not?

Doctor WILEY. The Attorney-General has now decided that we can advertise. Before, the Secretary was authorized to advertise the names of the dealers in such articles, but that provision was dropped out of the bill at the request of the dealers.

The CHAIRMAN. Not at the request of the dealers.

Doctor WILEY. It was dropped out some time ago. I do not know how it got out.

The CHAIRMAN. It is here now. The Secretary is authorized "to publish the results of such investigations."

Doctor WILEY. Yes; that is right; to publish the results. But it used to be to publish the names of the dealers. I wish that it was in there now. But I think, under the ruling of the Attorney-General, that we could do it.

The CHAIRMAN. In regard to this, we will give you specific authority in regard to these articles.

Doctor WILEY. Yes, sir. And there is a lot of fraud in vinegar, and, of course, all that we have control of at the present time is that which is imported, and there is no vinegar coming into this country that is not properly labeled, unless it is at some small port.

One of the principal works in the past year has been that on beverages. We have had a large force of skilled men working on this, and we have secured beverages the history of which we know. Through the internal revenue and the Secretary of the Treasury we have secured a great many samples of certified distilled liquors from the United States warehouses. Those are absolutely what they are claimed to be. In Europe I personally took from the barrels, in company with the excise officers in every country, a large number of samples, which I sealed myself in the presence of the excise officer, and those samples were also sent to this country. I collected about 550 samples of beverages, the origin of which we know.

We went then to the open market and bought two or three hundred additional samples. Now, we have completed the analyses of those samples. It was formerly claimed, and I have myself said before this committee that I did not believe I could tell by an analysis the difference between an original and an adulterated beverage of this kind. I have changed my mind, because the analysis has led to the conclusion that there is an absolutely definite chemical classification of these beverages. They fall into classes just as easily as things that have a distinct physical appearance that you can see from the eye. We have distinguished the straight whisky and the straight brandy from the imitated ones, and that is to be of immense help to us in our work on imported products. Now, the true whisky contains all of the volatile products which are produced at the temperature of distillation.

I formerly held—and it is only recently that I have changed my view—that I believed in the aging of whiskies it was the so-called fusel oils—that is, higher alcohol—that were oxidized. I was altogether mistaken in that, and I want to state to this committee that fact. Those elements which are oxidized are of that form which are known as aldehydes, etc. Fusel oils are not highly poisonous, as has been stated heretofore. The poisonous properties of freshly distilled liquors are not due to the alcohols (like amyl alcohol) which are present in very small proportion. In a pure state they are not injurious. Alcohols are all poisonous. Of course in one sense even ethyl alcohol is poisonous. Straight liquor contains all these volatile products, some of them changed only by aging. The imitated liquor contains pure spirits, mixed with anything that they choose to flavor

it with, adding prune juice, etc., and some of those mixtures are not of injurious substances, but they make a compound which is totally different, chemically and physiologically, from the real article.

Now, you can imitate the chemical properties of a natural product, but you can not duplicate its physiological properties. No man can duplicate nature. You can take a natural spring water and you can mix every material which that contains, and you will get a material which is, chemically, exactly the same, and yet physiologically it is different. You can take a still wine and force carbonic-acid gas into it and you will make a sparkling wine, but it is not the real champagne. I can not tell you why it is so, but it is so. I am here to say, therefore, that our investigations in the past year have convinced us that you can never make an imitated beverage by synthesis that should be allowed to be sold as the original.

Mr. BOWIE. Can you detect them?

Doctor WILEY. Yes, sir. But chemically they have not imitated the natural product, because they did not know what the natural product was. Our investigations have shown these great differences. I appealed to the Commissioner of Internal Revenue and said, "We have here certified as whisky, as distilled and stored whisky, a product which seems to me to be an imitated article. Can you tell me how this whisky was distilled?" It had every appearance to me of being a rectified article. He said that he did not have any record of the process. I happened to be going to New Orleans, and I went up to this distillery and they would not let me in, and I went and got a very influential resident of New Orleans and I went up again and saw this man, and still they would not let me in. So I said to him, "You say you will not let me in. I do not want to do it, but if you do not let me in, I will get an order from the Secretary of the Treasury to go in. I can telegraph and get an order in two hours, and I can get authority for the excise officer to go into your distillery, and I am going to do it if you will not let me in."

He said, "Well, I guess you can come in. I guess I will let you in." And so I went in and went through that distillery and saw just what they were doing there and how they were making the whisky.

Mr. BOWIE. What is that whisky made of?

Doctor WILEY. It is made of molasses and rectified as I supposed it was. They rectified it and rectified it until almost everything was taken out but the ethyl alcohol, and then labeled it pure Bourbon whisky. That shows how the chemist can trace even the nature of the distillation, as well as the material from which it is made.

Mr. HENRY. I should suppose that being made from molasses it would be rum.

Doctor WILEY. They had rectified it until there was no flavor of rum about it. It would have been rum if it had not been rectified. If you rectify it and take out all the ethers that make the rum, you have whisky.

Mr. DAVIS. If you find the whisky that contains all the elements of the natural product, how are you going to distinguish between that and the natural product?

Doctor WILEY. If it contained all the elements that nature adds, the chemist would be at sea. But then the connoisseur comes to your

help. You get a product that does not taste like the natural product; and if you did have one that tasted like the natural product, then the physiologist comes to your help. It does not have the same physiological effect.

Mr. DAVIS. Have you changed your views about the effect of alcohol?

Doctor WILEY. No, sir; not at all.

Mr. DAVIS. You believe that alcohol has nutritive qualities?

Doctor WILEY. Alcohol has a distinct food value up to a certain limit.

Mr. DAVIS. You agree with Doctor Atwater, then?

Doctor WILEY. Yes, sir; I believe what he says on the subject is all true and correct. I made a special report to the Secretary of Agriculture, and I went over the whole thing with Doctor Atwater, and his experiments, and I think that alcohol up to 3 ounces is completely oxidized in the average human frame within twenty-four hours. To that extent it is a food.

The CHAIRMAN. The next is "To publish the results of such investigations when thought advisable, and also the effect of cold storage upon the healthfulness of foods." You have not done much on that?

Doctor WILEY. We have done a great deal.

The CHAIRMAN. You have nothing to announce?

Doctor WILEY. We have investigated the cold storage of fruits. As I told you, we have finished that part, but the particular thing that we had in hand we have not finished yet, and that is very difficult for us to get at. There is one thing about this that makes it very difficult, and that is our failure to control cold-storage conditions. We have to depend upon the cold-storage houses, and they are very frank and helpful to us, and they are doing all they can; but you understand, when you conduct a scientific experiment in which temperature figures as an element, you must control that element yourself in order to be certain. We can do that by self-registering thermometers, and are doing the best we can. I will say for the cold-storage men that although some of them are afraid of it and all that, yet they indorse this very heartily.

I have gone before them three successive years when they have met in annual convention and discussed this problem, and they want to get at the very bottom of it. They do not want to do anything wrong, but they want to get at the bottom of things. Now, we are beginning with our meats. As I told some of the members of the committee, we are arranging to put 144 quail into cold storage, but we ran up against the law of North Carolina about exporting from the State a large number of birds and we could not do anything until we got a permit to take them out. Having got the game warden on our side, we have hired the men who are to kill these birds all on the same day and they are to be put into a cooled car and they will be shipped on here and will be here in twenty-four hours in excellent condition. We propose to draw half of those birds and leave the other half undrawn and put six of each dozen in one box and six in another box, and we will analyze and cook and taste one dozen, with a competent jury, to see about their chemical properties and their taste and their flavor, and at the end of three months we expect to take out another dozen and examine them as to the chemical analysis and cooking and tasting, and after another like period we

will take out another dozen, and so on for two years, until they are all gone.

Mr. BOWIE. You will keep those birds two years?

Doctor WILEY. Yes, sir. They are frozen absolutely solid, you know. I have gotten hold of one piece of beef with a record of eleven years in cold storage. That meat still has nutritive value, but when you come to taste it it is almost tasteless. That was a piece of beef that got lost in cold storage in Cleveland, and last December when the convention met there the owner of it told me that he had found that piece of meat and asked me if I would like to have it. I told him yes, that it was of the greatest value to me.

Mr. BOWIE. How did he send it to you?

Doctor WILEY. He brought it packed in ice.

Mr. BOWIE. So that it did not thaw out?

Doctor WILEY. No, sir; it came in good condition. At West Point I am getting valuable help from the commissary, Captain Franklin. He has a model cold-storage department there, thoroughly scientific, and he will supply me from time to time with foods with a history, and in that way I am getting help from the Army.

Mr. BOWIE. While some of that work is still in what might be called an experimental or unsolved state, do you think it would be entirely safe to publish the names of individuals and their business in a way to break them up, because at this stage of your examinations you have not proved the exact facts?

Doctor WILEY. I would not think of doing such a thing. In fact, under the old authority, when we had authority to publish names, we never published any analysis until we submitted it to the party and got his criticism on it. We never have done that.

Mr. BOWIE. I was going to say that it would be a little bit dangerous.

Doctor WILEY. I would not think of that unless we had the thing completed and the man himself had had an opportunity to inspect it and criticise it. We give every man a fair chance.

The CHAIRMAN. A "square deal."

Doctor WILEY. Yes.

The CHAIRMAN. The next clause is: "To enable the Secretary of Agriculture to investigate the character of food preservatives, coloring matters, and other substances added to foods, to determine their relation to digestion and to health and to establish the principles which should guide their use." That is rather a duplication of the other section, is it not?

Doctor WILEY. Yes; I have explained that.

The CHAIRMAN. The next clause is: "To enable the Secretary of Agriculture to investigate the character of the chemical and physical tests which are applied to American food products in other countries, and to inspect, before shipment, when desired by the shippers or owners of these food products, American food products intended for countries where chemical and physical tests are required before said food products are allowed to be sold in the countries mentioned, and for all necessary expenses connected with such inspection and studies of methods of analysis in foreign countries."

Doctor WILEY. Our work in that is growing slightly. It is altogether voluntary on the part of the exporter whether he has such an examination made, but just within the last few months we have

done a great deal of that. For instance, we export immense quantities of hops to Great Britain, and just now the regulations there are very strict as to sulphur in hops and also as to whether they contain any arsenic or not. When they are dried over coal, as they are frequently in the old country, they get arsenic in the hops. We are now completing the examination of 36 invoices of hops to be exported to England, where we will certify, if we find it so, that they contain no sulphur and no arsenic. We have done a great deal of this work, but not so much as we ought to have. The South American countries have very strict laws in regard to wines. We have inspected a number of invoices of wines within this fiscal year being shipped down there. They ship a good deal of that wine from California. That work is growing, and will continue to grow.

The CHAIRMAN. Will those foreign countries accept these certificates?

Doctor WILEY. They are prima facie evidence. They admit the goods at once, but, of course, may make an inspection of their own. Now, for instance, in Turkey they require a lard there—a so-called lard—that contains no pork fat. We have inspected invoices of lard, cotton-seed lard, which contained no pork. We have inspected that and certified that it contains no pork fat.

The CHAIRMAN. How much of that do they import; how much do they buy from us?

Doctor WILEY. I do not know the magnitude of its use. They never give us the size of a cargo. Samples are taken and examined, and it is sworn to before a notary public that they represent the cargo.

The CHAIRMAN. Suppose that lard goes to Turkey without a Government certificate; what happens to it?

Doctor WILEY. The Turkish authorities may say that it contains pork fat, and it will be rejected.

The CHAIRMAN. Will they not give it a fair show, analyze it, and give it some chemical test or something of that sort?

Doctor WILEY. The Turkish officials do not seem to have any great knowledge of chemistry, and if we take it there without a Government certificate they are likely to say that it contains pork fat and to throw it out.

Mr. HENRY. That is what is termed cottolene?

Doctor WILEY. Yes, sir; made in Savannah, mostly.

Mr. FIELD. It is cheaper than pork fat?

Doctor WILEY. Yes, sir; and a very good product. I use a good deal of it myself.

Mr. FIELD. It may have beef fat in it?

Doctor WILEY. Yes; but it has no pork fat. What they make for Turkey has not. We do cooperate in that work and that work is growing.

The CHAIRMAN. The work on hops and lard and wine on the Pacific coast?

Doctor WILEY. Yes, sir; and we have inspected large quantities of cereals and breakfast foods and wines of all descriptions.

Mr. FIELD. And you give them practically a Government certificate?

Doctor WILEY. We have never found any offered for our examination that are not all right, except at times excessive sulphur and

arsenic in hops. That certificate goes abroad with the goods and helps them, and the goods go right in. Our certificate has never been questioned in so far as I know.

Mr. HENRY. You have no trouble with exported wines?

Doctor WILEY. Not with that certificate with it.

Mr. HENRY. You do not find any adulterated wines?

Doctor WILEY. Not for export. They are all straight wines.

The CHAIRMAN. The next clause is, "To enable the Secretary of Agriculture in collaboration with the Association of Official Agricultural Chemists, and such other experts as he may deem necessary, to establish standards of purity for food products and to determine what are regarded as adulterations therein." You have tried to have every State adopt the same standards?

Doctor WILEY. That is desirable. The object, first, is to get a standard that is reasonable and just, and to that end we have made hundreds and hundreds of analyses, and we have consulted all kinds of experts, in business and otherwise, and gotten every kind of information that we could. The work is not expensive; I do not think it costs \$3,000 a year. This committee, aside from the speaker, is composed of eminent men who are totally unbiassed. One of them—M. A. Scovel—is a director of the agricultural experiment station in Kentucky, and he stands among the highest of our directors. Another—H. A. Weber—is a professor of agricultural chemistry in the Ohio University. Another—Doctor Jenkins—is director of the experiment station in Connecticut, whom you all know of, at least. Another is the vice-director of the Pennsylvania State College station—Doctor Frear.

We meet and we send out invitations and formulate provisional standards, with the data we have at hand, and send them out to the trade and all experts, and we hold a meeting first in one part of the country and then in another, and we ask these interested parties to come before us, and we have hearings that last often six days, just like these hearings that you have here. Then we sift all this evidence; and I believe that we are getting at the real bottom facts; and doing the greatest possible work for the States and for the people in establishing standards of purity.

The CHAIRMAN. How about these prosecutions and convictions in courts as affecting these people? I know that you have difficulty in getting convictions owing to the different standards in the different States. If the States would all adopt the same standards, you would have much less trouble.

Doctor WILEY. In the enforcement of the pure-food laws the greatest difficulty has been to have any standard of comparison. One side will bring in one expert and he will swear that a certain ingredient is deleterious, and the other will bring in another expert who will swear that it is not. We have sent out copies of certain standards that we have formulated, and they have been acknowledged to be the best ever proposed.

The CHAIRMAN. What have you standards for?

Doctor WILEY. For all dairy products, except ice cream—we do not seem to be able to get any standard for that—all fresh and manufactured meats, manufactured cereal products, breads, etc. We have standards for all vinegars and ciders, for jams and jellies,

and all other products of that kind, and condiments. Those are placed and fixed.

The CHAIRMAN. You have standardized those?

Doctor WILEY. Yes, sir. And now we have almost ready for the signature of the Secretary a report on standards for flavoring extracts. We have been working on that for a year, and have examined hundreds of flavoring extracts. And we have been examining the very important matter of beverages. We have only proclaimed standards on wines. We are going to have an interesting time securing standards for distilled beverages. That is the reason that we have made this great lot of analyses. I believe that is the work we have done, and it is of extreme value and is not very expensive.

The CHAIRMAN. To what extent have the several States adopted these standards that you have declared?

Doctor WILEY. Four or five of the States have passed acts of their legislatures legalizing these standards in those States. Some of the other States have not passed acts in regard to these standards, but have food commissioners who have adopted them, as it is their right and privilege to adopt them. In no case have these standards been rejected, and they are enforced in State and Federal and municipal courts. Those convictions made in Philadelphia last year, for instance, for selling sausage to the navy-yard that had borax in the meat were made on the standards of the United States Government.

There never was a time when there was such a necessity for national pure-food laws as there is to-day.

Mr. LAMB. Has Virginia done anything about these standards?

Doctor WILEY. I do not think so, officially.

Mr. LAMB. Her legislature is in session now. Do you think it would be well for them to do anything?

Doctor WILEY. I wish they would make some recognition of these standards. Have you a pure-food and drug law in your State?

Mr. LAMB. I think not.

Doctor WILEY. Then they would not be able to do anything in this direction until they passed such a law.

Mr. FIELD. You do not consider the taste of the food as of sufficient importance to recognize—that is, the effect on the palate?

Doctor WILEY. Yes, sir; all our work on condiments refers to that, of course—to the taste. Naturally a food should be palatable or it would not be in fit condition for use.

The CHAIRMAN. The next item is: "To investigate, in collaboration with the Bureau of Animal Industry, the chemistry of dairy products and of adulterants used therein and of the adulterated products; to determine the composition of process, renovated, or adulterated, and other treated butters and other chemical studies relating to dairy products, and to make all analyses of samples required for the execution of the law regulating the manufacture of process, renovated, or adulterated butter."

What have you done along these lines?

Doctor WILEY. We have kept one laboratory busy the whole year in that work. We do all the work. We examine hundreds and hundreds of samples of renovated butter which are inspected by the Bureau of Animal Industry. We make the chemical examinations. We work together with the Bureau of Animal Industry in that work.

We do not have anything to do with the oleomargarine law. We make all the examinations for the Bureau of Animal Industry. We keep three men busy at that all the time. As some of the members may remember, I was not very much in favor of this law at the time it was proposed, but now that it is on the statute books we are doing all that we can to execute it properly.

The CHAIRMAN. What have you found; that it is injurious to health?

Doctor WILEY. We have found a great deal of renovated butter sold as butter. Another thing is, we have found many cases in which they have put more water into the butter than we have decided they should do—more than is proper, according to our standard. We will not allow, according to our standard, more than 16 per cent of water. We put it a little high at that. We have a lot of cases in which water was put in the butter to increase the weight. That is especially true with the renovated butters, and that is quite a large percentage. We have also found that butter is preserved with some material, contrary to the regulations, principally with borax. We have had a great deal to do in that line.

The CHAIRMAN. Is that all you care to state to us on the subject of dairying and buttering?

Doctor WILEY. That covers the ground. We do not initiate any of this ourselves.

The CHAIRMAN. That is done in cooperation with the Bureau of Animal Industry?

Doctor WILEY. Yes, sir; and they keep us loaded up all the time.

Mr. FIELD. Coloring matter is used in butter?

Doctor WILEY. Yes, unfortunately; and it is legalized; that is to say, Congress has legalized the adulteration of butter.

The CHAIRMAN. Will you state how they did that?

Doctor WILEY. They did it by legalizing the coloring of butter with certain substances, and penalizing the coloring of another substance—oleomargarine.

Mr. FIELD. What is that coloring done with?

Doctor WILEY. Almost invariably with coal-tar dye, although one or two States require annatto. Wherever the State law does not require a vegetable substance coal-tar dye is used. You go out on the street here and you buy a dozen samples of butter, and I will venture to say that every one of them will be colored with coal-tar dye. You will remember that one of the arguments used in favor of legalizing the coloring matter for butter was that it would insure a uniformity of color. You can not find two samples of butter the same color to-day. One sample is almost red and another is almost colorless.

The CHAIRMAN. Butter is colored to please the eye according to the preference in different localities?

Doctor WILEY. Yes, sir. The coloring of butter has vitiated the eye and the taste; and then they make what will please the vitiated taste. Now, when the people of this country come to a real careful consideration of this subject the coloring of butter will cease. The high-priced butter to-day is uncolored. The grocers of the city here to-day are keeping butter which is almost uncolored; they have a great demand for it. I will not eat colored butter if I can get anything else. It is marvelous to see the change here from high, red-

colored butter to almost uncolored butter. There is a wonderful reformation in the public taste in regard to the coloring of butter.

The CHAIRMAN. You go down into the Tropics and they must have it very highly colored; it is almost a brick color.

Doctor WILEY. Yes; it is nearly red.

Mr. FIELD. Is the matter which is used for the coloring of butter injurious?

Doctor WILEY. Coal-tar dyes, in my opinion, are injurious. They are all excreted by the kidneys. There is a great strain put on the kidneys by our people anyway, and when you eat this butter colored with these coal-tar dyes you put on them just that much more work, and everything you put on the kidneys hurts just that much more. The argument used by the borax men is that you can put a little borax in and it will not hurt people, because it will all go out through the kidneys. You know this country is full of diseases of the kidneys, diabetes and Bright's disease, especially among the good livers of the country; of course not among the more frugal ones (like myself). We are overburdening the kidneys all the time.

Mr. LAMB. That is the reason why they have to cut out the prostate gland?

Doctor WILEY. Yes, sir; and that is the reason why they have to cut the kidneys out sometimes. One of my best friends has but one kidney. He gets along with that by very careful diet; but he overloaded his kidneys and they became inflamed, and he had to have one of them removed. Kidney disease is alarmingly on the increase.

The CHAIRMAN. The next item is, "To study, in collaboration with the Weather Bureau, the Bureau of Plant Industry, and agricultural experiment stations, the influence of environment upon the chemical composition of wheat and other cereals, with especial reference to the variation in the content of gluten, and the suitability of barley for brewing and other purposes."

Doctor WILEY. We have done and are doing a great deal of work under that. We did a great deal under that last year.

The CHAIRMAN. Take up the question of gluten, first, and the influence of environment upon the chemical composition of wheat and other cereals with reference to the variation in the content of gluten.

Doctor WILEY. I will tell you how we do that. We take a sample of wheat—that is, good wheat, and make a careful examination of it in reference to its content of gluten and other materials—a complete analysis. Then, through the agricultural stations, we get it planted in all kinds of climates, as far removed as possible from each other, in different environments. Then the Weather Bureau furnishes us a schedule of rainfall and temperature and sunshine of those localities, and when the wheat is harvested it is sent back to us, and we compare it with the original seed and we find the greatest possible variations in the product. I have seen the gluten in the seed where, say, it had 12 per cent of protein in the wheat and it fell to 7 per cent in one locality and rose to 16 per cent in another. We take the conditions of soil and atmosphere and climate and study what are the things that affect the wheat in this way, with the purpose of getting some kind of control, so that an agriculturist will know that he can grow a certain quality of wheat.

The CHAIRMAN. That is quite interesting; but I do not see how the ordinary farmer is going to get much benefit from it; how you can arrive at results that will be practical to him.

Doctor WILEY. I do not know that I could specify just how these results would come about. I do know this, that if you can determine the cause of this in some way it is going to help the farmer. Now, you will be surprised to know that I have completed another piece of work—that is, this very problem applied to the sugar beet.

The CHAIRMAN. You will find further down it says something about the sugar beet, but will you not tell us about this item right here—the suitability of barley for brewing?

Doctor WILEY. That is a most interesting experiment. We have collected from farmers and experiment stations about 150 samples of American-grown barley, and we have an equal number for this crop of last autumn. We have subjected all of these first to analysis, and then we have malted those and have determined what is the diastatic power for the commercial results, and we have made beer out of that, and examined the beer to see what effect the chemical character of the barley and the chemical character of the malt had had upon the flavor and the taste of the beer. The object of that is to determine for our farmers and our brewers a problem that has troubled the scientific world for the last twenty-five years, namely, What influence has the content of gluten upon the barley and upon the character of the beer that is produced? There is the greatest possible difference of opinion existing in regard to this, and no systematic effort has been made to answer that until we commenced this investigation. This is going to be of great value in determining the localities in our country where the best barleys can be grown.

The CHAIRMAN. How much further have you to go in that line? Have you arrived at any definite results?

Doctor WILEY. No, sir. In a case of this kind, where we have so many changing elements in the environment, it is altogether unsafe to base your conclusions upon a single year's experiments. It will take five years—five separate crops, at least—before we could venture to form a definite conclusion. This is a kind of work that can not be pushed. It is absolutely necessary that it extend over a period of time that will establish the constancy of the results.

(At 12.40 o'clock p. m. the committee adjourned until Wednesday, January 31, 1906, at 10.30 o'clock a. m.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Wednesday, January 31, 1906.

The committee met at 11 o'clock a. m., Hon. E. Stevens Henry in the chair.

Mr. HENRY. Mr. Wadsworth is not here this morning, but he requested that the hearings go right along. We will hear Doctor Wiley further this morning.

Going on from the place where we stopped the other day, I believe the next is—

To investigate the chemical composition of sugar and starch producing plants in the United States and its possessions, and, in collaboration with the Weather Bureau, the Bureau of Plant Industry, and agricultural experiment stations, to study the effects of environment upon the chemical composition of sugar and starch producing plants.

There is where you left off, is it not?

Doctor WILEY. Yes, sir. This authority has been exercised in the following way. It is now about six or eight years since this specific authority was given to the Department. We all know of the great variations in the chemical composition of agricultural crops in different localities. That has been known since agriculture was a science. And the question which we had to solve was, what were the particular factors in the environment which produced these wonderful variations in the chemical composition of the crops, as, for instance, wheat? We have found that in some localities wheat would have a high gluten content and a low starch content, while in other localities it would have a low gluten content and a high starch content. It was known that in certain localities the sugar beet would have a high sugar content and in others a low content of sugar. The old idea was that it was due to the soil. We often heard in the old times that the soil would produce a high sugar content in one case and a low sugar content in the other.

The object of our investigations, which were begun in sugar beets, was to find out what was the particular factor or what were the factors in the environment which produced these variations, and to do this we marked out what I believe is an entirely new line of agricultural investigation, so far as I know, a line which is possible to be followed in this country, and which would not be possible in many other countries, because they do not have the climatic variations in the smaller countries, especially of Europe, that we have in this country. We can go from the Arctic to the Tropics and from the far east to the far west, thus securing climatic variations in the environment which could not be secured in a country like England or like France.

To this end our first work was with the sugar beet, and I stated to the chairman on Monday that he would probably be surprised to know that another line of investigation had been completed by the Department of Agriculture. We planned a line of five years' work in collaboration with the agricultural experiment stations, passing from North Carolina (south) to Geneva, N. Y. (north), and from the New York station (east) to the California station (west), thus covering practically the whole country, north and south, east and west. Those investigations have been completed with the sugar beet and have now been collected and published as one volume, five separate bulletins, one for each year, and a general discussion of the five years' work. Now, we found in the first place that the soil had absolutely nothing to do with the sugar content. Soil makes only a big or a small crop.

Mr. HENRY. When you commenced you thought it had all to do with it?

Doctor WILEY. Yes, sir; that was conceded everywhere, that the soil was necessary to grow a rich sugar beet. I was, of course, doubtful of that when I commenced my investigations. Soil deter-

mines the magnitude of the crop, and soil and fertilizer determine the magnitude of the crop and to a certain extent affect the character of the crop. The larger the beet the smaller the sugar content, and, other things being equal, the smaller the beet the larger the sugar content in proportion to the size of the beet. But that is a mere incident of growth. That is because the place in which to store the sugar is so much smaller in the small beet, and the plant attempts to make a certain quantity of sugar, and having a smaller place in which to store it, it makes a richer store, a richer beet, so far as its content is concerned. The rainfall has nothing to do with the content of the beet except in so far as it secures a uniform growth.

If you have a drought, you will increase the quantity of sugar in the beet, because the beet is stunted, not because of any abnormal influence of dryness; but if you have an even distribution of the rainfall, the beet may contain a less amount of sugar as to the percentage of composition, but a vastly greater amount of total sugar.

Now, the strange thing that came out, and that is absolutely demonstrated in the five years' work, is that the controlling factor in the sugar content of the beet is the temperature of growth. That had been suspected before, but had never been elaborated in a scientific way. Now we have positive proof of that. We collaborated with the Weather Bureau in this matter, they contributing the data of temperature and rainfall and sunshine, and we have tabulated the results. If we construct a curve, on a map, in which the temperature is represented by one line, passing over the paper, and the sugar content is represented by another line, as the temperature goes up the sugar content goes down, and they form a perfect "X;" and when they are plotted for five years, they cross each other like this [indicating].

The fertilizer used, the distribution of the rainfall and of sunshine, we used all of these, and giving due weight to the different factors of the problem, we came to a conclusion. Now, you can see the enormous economic bearing of this; that if you want to grow a sugar beet, you do not care so much about the soil, because you can make a poor soil fertile, and you do not care so much about the rainfall, because you can corral the waters by dams and make an even distribution in places where there is no such distribution naturally—that is, man can control every factor of the crop except that most important one of the temperature, and that he can not control, and therefore it is useless to attempt to foster the sugar-beet industry in a locality where the temperatures in the summer are high.

Mr. HENRY. That is the reason they produce better results in the semiarid regions?

Doctor WILEY. The temperature is right in those arid regions and in the lake regions it is right, and Geneva, N. Y., has a splendid temperature, and the Geneva station, of all our stations during the five years, made the best record.

Mr. HAUGEN. How about Minnesota?

Doctor WILEY. Minnesota has a short growing season. The beet has not time to ripen. You can not get so far north that you can not raise the beet, of course, but the point is to produce it under the most favorable conditions.

Mr. HAUGEN. How about Iowa?

Doctor WILEY. Iowa is not altogether favorable. It has a hot summer and an early autumn.

Mr. HAUGEN. How about Nebraska?

Doctor WILEY. That is the same way.

Mr. LAMB. How about Virginia, the valley of the James River?

Doctor WILEY. Tide-water Virginia will never be able to do much in that line, but farther up, toward the mountains, you can grow good beets on the table-land, the high plateau.

Mr. LAMB. Is that true of the valley of the James River?

Doctor WILEY. You can not grow beets there; it is too hot.

Mr. LAMB. We got 12 per cent there at the station.

Doctor WILEY. Yes; but at Geneva, N. Y., they got 16 per cent. If there was no other place that could grow beets but Virginia, you could make that the sugar-producing region of the world, but you can not grow them in competition with these other places.

Mr. LAMB. That cuts us out?

Doctor WILEY. Yes, entirely. Now, having finished with that, we have taken up a new line, and that is as to the cause of the variations of the sweetness of sweet corn, used for canning purposes. We have had one year's work on that. We commenced in North Carolina, and planted the same corn in North Carolina, Maryland, New Jersey, Connecticut, and Maine, and we sent out the chemists right to the field.

They commenced in North Carolina, because the corn ripened there first. They took the ears right off of the stalk fresh and analyzed them, and then stored other ears and examined them after twenty-four hours, and after forty-eight hours, and so forth. On one year's work I can not make any generalizations. That would be unsafe. We have to have a series of these experiments before we can do that. But we did find this important factor: That sweet corn will lose, even in a cool place, almost half of its sugar in twenty-four hours. That shows the importance of the sweet corn being grown close by the place where it is used, so that it can be taken practically directly from the stalk to the table.

Mr. HENRY. Almost every man who grows corn has discovered that fact.

Doctor WILEY. But we have actually determined that this sugar is used up; not fermented, but perhaps converted into starch—that is, the corn is still alive, and, getting no further supplies from the stalk, it is utilizing its own supplies in making starch, and therefore nearly half of the sugar of the Indian corn in twenty-four hours is gone.

Mr. HASKINS. That is, even with the husks remaining on?

Doctor WILEY. Yes, sir; even when the husks remain on. That shows that we must have a supply of Indian corn so that it can reach the market in a few hours after it is harvested, so as to have the best corn.

We did find some variations in the corn in the first year's work. I am not prepared to state any conclusions, but it is reasonable to suppose from the work that we did with the beet that we are going to get the sweetest corn in the North. I believe in commerce to-day that the corn of Maine is preferred to that of almost any other States as being sweeter and more palatable than the corn that is canned in Maryland or North Carolina, although our Maryland farmers will strongly contest that. I am not saying that it is a fact, but it is the impression in the market to such an extent that the dealers have even

gone to the extent of false labeling of their products as the corn of Maine when it is not, because of the high character of the product in the markets of the country. I am not speaking of this as any definite conclusion, but I am merely stating the impression which may be borne out by our further work.

Mr. COCKS. In regard to sweet corn losing its sweetness. You have not any way to suggest to preserve that?

Doctor WILEY. The only way is to put it down in cold storage. If the farmer had any way of reducing his temperature in an economic way, he could preserve it for some time.

Mr. COCKS. In my district we have many truck farmers, and they pull the corn and pile it up on the wagon when it is so hot that you can not bear your hand on it.

Doctor WILEY. Of course that is very bad, and there is a great loss of the sugar in the corn there.

Mr. COCKS. It is no wonder they say that we bring field corn in town?

Doctor WILEY. No.

Mr. LEVER. Have you examined as to the percentage of sugar in the corn?

Doctor WILEY. Yes; we have those figures down for one year. They are very remarkable. I knew that Indian corn lost its sweetness in that way, but I had no notion that it was going so rapidly. That was an incident to our investigation. We did not begin our investigation for that purpose, and we did that merely incidentally, and will continue to study that point in subsequent investigations. That is what we are doing in the line of research, pure and simple, without any ulterior motive, and then applying the results to agriculture; and, as I said on Monday when I was asked if a certain investigation would be of any immediate benefit to the farmer, that I did not see how it could apply, but I had no doubt that every fact or truth that science discovers regarding the chemical composition of these bodies will in some way be useful—I do not know just how—to the agriculture of the country. There is no doubt of that.

Now, we propose, of course, if our work continues, when we get through with these investigations of Indian corn, to take up some other crop. We are working now on wheat with the Bureau of Plant Industry, studying the distribution of gluten content, and have been doing that for five years. We have finished the study of the sugar beet and determined the causes of the variations therein and have finished one year's work and are now beginning another year's investigation of the fresh sweet Indian corn.

Mr. COCKS. This Indian corn grown in these different localities was all of the same variety?

Doctor WILEY. All of the same seed. It must be that, or we could not compare results.

Mr. COCKS. Grown where?

Doctor WILEY. The seed was grown in Connecticut, I think, and distributed north and south.

Mr. HENRY. All of the same variety?

Doctor WILEY. The same variety. That is necessary in order to make comparisons.

Mr. COCKS. Certainly. I just wondered whether it was northern or southern corn.

Doctor WILEY. We had to get an early maturing variety, because Maine could not grow a later maturing variety. I think it would be better to get a later maturing variety, leaving out certain of the northern States, in some future experiment.

Mr. HAUGEN. What can you tell us about this matter of free alcohol in the arts?

Doctor WILEY. I intend to make a statement before the Ways and Means Committee about that some time in the near future, but this committee is interested in one phase of the question, and if there is no objection I would like to say a word in answer to this question, although it is not in this bill.

Mr. HENRY. Certainly; we will be glad to hear you.

Doctor WILEY. I want to say just one word respecting denatured alcohol. I have always been in favor of tax-free alcohol in the arts. I think everybody is, if the revenues of the Government are not defrauded. I refer to the denatured alcohol. This is of the greatest importance from the agricultural point of view, because we have vast regions in this country where alcohol-producing plants can be grown, if we can get a market for the tax-free alcohol. Many of you are from the Indian corn growing States.

Mr. BOWIE. Is there anybody in the country who is not from a corn-growing State? I think all the States are corn-growing States.

Doctor WILEY. Yes; that is true. Now, Indian corn has been practically the sole source of alcohol in this country, used both as a beverage—that is, I mean as a distilled beverage—and in the arts.

The price of Indian corn is, fortunately for the farmer, I think, going higher and higher. I do not believe it ever will go down again to the old price of 15 cents. I have sold Indian corn as low as 19 cents a bushel, and made money at it, too; more, perhaps, than I have made in the service of the Government. I want to say to this committee that I can grow a field of corn as well as any member of this committee, and do all the work myself, as I have done before.

Mr. HENRY. We believe it.

Mr. BOWIE. You can beat me, I think.

Doctor WILEY. I can plow as good a furrow to-day as anyone here.

Mr. LAMB. You can not beat me.

Doctor WILEY. I will enter a contest. Now, we are to seek some cheaper source for alcohol. What is that cheaper source? There are several of them. The Irish potato is one, and the sweet potato and the yam are very hopeful sources, and the cassava.

But there is another source which is absolutely wasted, and that is the stalk of the Indian corn itself, at the time the grains are just hardening. It is hardly known, even among our chemists, that at that moment there is as much fermentable matter in the stalk as in the grain itself. The stalk is full of sugar, and also starch, distributed all through it. If you cut a stalk of corn and put iodine on it, it will turn blue. It is full of starch. Analysis has shown that from 12 to 15 per cent of fermentable matter exists in the Indian corn stalk at that time, which, if it could be extracted, would furnish power and light practically for the whole civilized world, and yet every particle of that is evaporated, and goes out into the air, except a very insignificant fraction which goes into the silos.

Mr. LAMB. Could you utilize the stalk at that time without losing your corn?

Doctor WILEY. The corn is perfectly sound, and if harvested it would be even plumper than it is when left to get hard before it is pulled.

Mr. HENRY. I know that to be a fact.

Doctor WILEY. But it would have to be cured after pulling. But so far as the harvesting of the corn is concerned, just as the grains grow hard they are plumper and make a better article if harvested at that time. But of course there are immense technical difficulties connected with the harvesting of these cornstalks. You would have to make use of all this material in four weeks' time or it would be past use. I just wanted to call the attention of the committee to the fact that this is one of the great possibilities of the future. The sweet potato and the yam in the South have untold possibilities for alcohol and glucose manufacture. And I believe that as Indian corn can be so completely utilized in other ways, in the near future these now unused sources of alcohol and glucose in the country will be exploited to the great benefit of American agriculture. In that respect the question of free alcohol in the arts interests practically the farmers of this country.

Mr. BOWIE. Would this alcohol that you refer to have any connection with the making of artificial silk which has recently been spoken of?

Doctor WILEY. Yes, sir; that is one of the most important uses; and also in the manufacture of smokeless powder and medicines and tinctures.

Now, I go further than to say that you may use denatured alcohol, because there are so many purposes to which denatured alcohol can not be put. The alcohol must, in some case, be pure. I say that the use of denatured alcohol may be allowed without supervision, and the use of pure alcohol be allowed under Government supervision—that is, by manufacturing establishments which are able to pay for the control. There are a half a dozen ways of using it, which I shall bring out in my paper before the Ways and Means Committee, but the principal way is by methylating—that is, by adding crude methyl alcohol. That fits it for burning; and it is also denatured by treating with pyridine and nicotine.

In fact, alcohol treated with anything you can put into it which comes over as the alcohol comes over, and which is nasty, so that you can not drink it, is denatured alcohol. Often it has been found that practically nothing will prevent the drinking of alcohol if people are determined to drink it. Alcohol fiends will drink alcohol right off of pathological specimens, such as cancerous growths. They are so depraved that you can not do anything with them, and you can not protect that class of humanity, and no bill ought to try to protect them.

Mr. HENRY. They are gone already.

Doctor WILEY. Yes; and the quicker they kill themselves the better.

Mr. HAUGEN. Do you know what alcohol costs?

Doctor WILEY. Yes, sir; I know what it costs.

Mr. HAUGEN. As compared with other fuels?

Doctor WILEY. With the price of Indian corn as it is to-day, alcohol costs about 18 cents the proof gallon and 36 cents the absolute gallon. That is actual cost, without the profit which should go to the maker.

Mr. HAUGEN. At what price for corn, Doctor?

Doctor WILEY. I think the price of Indian corn is about 40 cents.

Mr. HAUGEN. Now, as to the value of a gallon of alcohol as compared with a gallon of gasoline as fuel?

Doctor WILEY. Just now the gasoline is cheaper.

Mr. HAUGEN. And how is it as to the value?

Doctor WILEY. Gasoline also has a higher heating value than alcohol. Gasoline is not oxidized at all. It is composed of carbon and hydrogen only.

Alcohol has one molecule of water in it. It is C_2H_5OH , having one molecule of water in its composition. Therefore if you burn a pound of alcohol you get about 6,000 calories of heat, while from a pound of gasoline you get about 8,000 calories of heat. Further than that, the price of gasoline is going up all the time. Gasoline is a fixed quantity. It is not making any more. All that is left of what the Lord has made is there, and it is being used up very rapidly. A proof gallon of alcohol (half alcohol and half water) costs nearly 20 cents, and an absolute gallon—that is, with no water—costs about 40 cents.

Mr. HAUGEN. Call it 20 cents.

Doctor WILEY. Yes; it would be just about that.

Mr. HAUGEN. Now, I understand that it can be manufactured on the farm at a very small expense.

Doctor WILEY. I doubt if the distilling in a small way will ever pay. It is like sugar making—it will only pay on a large scale. In Europe they have these distilleries that drive around the country and distill for the farmers. That is not the way to make alcohol. The way to do it is in a large factory, just as it is with sugar, and it is for the benefit of the farmer to have it made that way.

Mr. ADAMS. There is a strong effort being made by temperance organizations to prevent the passage of this bill removing the tax on alcohol. Can you see how any reasonable opposition can be made by the temperance people to the enactment of a bill like this?

Doctor WILEY. I can not see any. I am a temperance man myself. I believe in using alcohol, if at all, moderately. I believe that is temperance. I can not see how even those who are total abstainers can have any objection to the use of alcohol in the arts. It seems to me they are the very people who ought to stand by this bill and get all the alcohol into the arts, if possible, and then there would be none of it left to drink.

Mr. BOWIE. There was once a man, you know, who started to drink all the whisky in the world, but he failed.

Doctor WILEY. Yes; I know. I think that is a mighty poor way to overcome the use of the drinking evil—to prevent the use of alcohol in the arts. Many of the arts would be destroyed if alcohol were forbidden. How could you make smokeless powder, how could you make artificial silk, and how could you make varnishes? It is an absolute necessity in the arts, and we are away behind other countries in the matter of permitting the use of free alcohol in the arts. The only place where we permit it now is in scientific institutions and in the Government service in this country, and who ever heard of any abuse so far?

Mr. BOWIE. You think there is no doubt about the ability, from an administrative standpoint, to so fix the law that the illegal or illegitimate use of alcohol can be prevented if we make it free for the arts?

Doctor WILEY. I have not the least doubt about that. Only I will say this, that no law can prevent absolutely illegality. You never could pass a law preventing a man from drinking the alcohol off of a pathological specimen—a cancer, for instance—or prevent a man killing some one occasionally. I believe that we can have free alcohol without any loss to the revenues. But to fix it so that nobody would ever drink it I would say was not possible. You remember that a free-alcohol law was passed a few years ago, and it was left in this way, that the Secretary of the Treasury was authorized to issue instructions to regulate its use, and he took the ground that you could not have any such instructions, because you could not so denature alcohol that you could not drink it.

He was right. We did a part of the work and gave him the data which he used in coming to that conclusion. The question was put to us, Can you secure pure alcohol out of this fit to drink? And I will say that there is no denatured product that a chemist with skill can not so handle as to produce a potable alcohol therefrom.

Mr. BOWIE. But it would be cheaper to pay the ordinary tax?

Doctor WILEY. I should say so—many times cheaper. I can put pyridine or nicotine in that alcohol, and after working a week I can get a gallon of pure alcohol, which might cost \$100. The Secretary of the Treasury therefore said that you could not denature alcohol so that you could not drink it. The Supreme Court sustained his opinion on the data given the Secretary of the Treasury, and that is the situation as it is to-day.

The law ought to make it mandatory on the Secretary of the Treasury to issue those regulations, and should not leave it in his discretion whether they should be carried out or not, and then the fiscal interests of the Government could be absolutely conserved, and there would be no spread of drunkenness or intemperance any more than there is to-day—not as much.

Mr. HENRY. Will you come back now to the proposition of the bill itself?

Doctor WILEY. Yes; I am ready. Mr. Chairman, I would like to submit one statement. I was asked when I was here before if I could apportion the expenditures between the different divisions of the Bureau. Since that time I have had my bookkeeper draw up such a statement, which I should like to submit for publication with the other data that I have given. This gives the amount of money given to and employed in each division of the Bureau. I believe the next item is the inspection of imported food products.

Mr. HENRY. Yes, sir.

Doctor WILEY. I have not much to say on that subject in addition to what I said last year. I brought up here to-day some samples to show the committee, as an index of what we are doing. These are some samples which have just come in, and they are not different from the ordinary samples that we secure of this kind. I want you to look at these as showing the necessity and utility of such inspection [exhibiting small glass jars]. I have here a package of mushrooms that came in a tin can. I have put them in this glass bottle so that the committee can see their character. That is a pretty rocky lot, but

that is not so much objected to as the label under which they come. Those are imported under the name of "Champignons naturels"—natural mushrooms. They are in reality sweepings of the factory where good mushrooms are put up, as you can see pieces and stumps and discolored particles which are partially decayed and have large fungous growths upon them.

By putting that stuff in cans and labeling it "natural mushrooms," of course the purchaser will never see the character of the goods until he opens the can. We have just refused admission to a lot of those goods. We do not go into the question of injury to health in this case; we do not need to. They were wrongly labeled. That is an illustration of this thing. The label is a false one. They are not natural mushrooms; they are fragments or pieces of unnatural mushrooms.

MR. ADAMS. Is there any dropping off of the attempts to introduce adulterated goods into this country?

DOCTOR WILEY. I should say at this time that nine-tenths of the goods that originally came misbranded are properly labeled.

MR. ADAMS. The law has worked a great reform.

DOCTOR WILEY. It has worked not only a great reform, but a revolution in the way of labeling goods.

There is a great misunderstanding among the people of this country respecting the real objection to adulterated foods. As I have said to this committee before, it is not so much a question of health. Good healthy men can eat adulterated foods—I can eat them—without any danger once in a while. There are some forms that seriously injure the health. The principal objection, however, is on the ground of their fraudulent character. That can of mushrooms has been sterilized, and I have no doubt that it could be made up into a sauce and not be particularly injurious to the health; but it is a fraud, pure and simple, upon the American purchaser.

Here is a different case. This is one of our inspections which has just come to-day. The contents of this bottle were taken out of a package and put into this jar. That is spinach—greens. Now, there is no objection to greens. I am very fond of them, especially when cooked with a good piece of pork. We object to that because it is overloaded with sulphate of copper. It is full of it, so full that we say, "No; you can not import this; it is injurious to health." There are two illustrations of the principle on which we work.

MR. ADAMS. What would be the quantity of copper that would be permissible, if any?

DOCTOR WILEY. We admit at present 20 milligrams to the pound. This spinach has over 100 milligrams to the pound. I think we will eventually refuse admission to them altogether; but we do not want to be too hard on them at first, especially as the results of our work with copper sulphate have not been published, and so we say, "Use sulphate of copper as you have been using it and we will admit it if labeled, but not above a certain limit." But this is above any limit. If you should eat as much as there is in there, it would probably produce violent emesis, just as sulphate of copper does.

There is one other specimen which I wish I had brought; I had it right on my desk. That came under another provision of law—that if it is falsely labeled as to the country where it is made, it may be

refused admission. I have just had some Italian goods come in with a French label on them. We said, "No; you have attempted to deceive our people. We have no objection to the state of the goods or anything of that kind, but you have a wrong and deceitful label on it. Either take this label off and put on another or take your goods back again." On the first offense we allow them to relabel, but on the second offense we do not allow them to come in at all.

Mr. ADAMS. Can you give us any idea or is there any statement here as to the expense of this foreign inspection service?

Doctor WILEY. Yes, sir; it is all in this statement.

Mr. ADAMS. It will be published in the record?

Doctor WILEY. Yes, sir; it will be published in the record. You will be surprised at the small expense of this. I say that it is a good work, and when you give several hundred thousand dollars to inspect cereals and meats for exportation—and they ought to be inspected in this country—and we do this work for less than \$50,000, I think you will say that it is very inexpensive.

Mr. HENRY. It does not amount to \$50,000?

Doctor WILEY. No, sir; and yet we do this work for our whole people at this small expense. We would like to extend this service a little, and I have asked \$32,000 increase this year chiefly to extend this inspection service.

Mr. HENRY. If I recollect, you have employed some inspectors abroad?

Doctor WILEY. No, sir; you would not allow it. We did not employ any inspectors abroad, because it was the opinion of the committee that we ought not to do it. We ought to do it, I think. The Treasury has inspectors there all the time. I noticed last year that the committee did not seem to approve of that work. We have extended our service, under the amount you gave us here, and have established, since I last appeared before you, four new inspection laboratories—one at Boston, one at Philadelphia, one at New Orleans, and one at Chicago—and those are partially equipped and are now at work, not with as much force as they should have; but if we get an increase this year we will put additional men in all these laboratories. Eighty per cent of the imports come into New York, and there we do the greater amount of our inspection work; but we must take care of our importations.

The Secretary of the Treasury is collaborating with us cordially in this respect. We have had a letter from the officials in New York saying that fresh eggs, broken in China and preserved with boric acid, not fit for any human consumption, are still sold in this country, and they must be coming in through some other port than New York, and so it will be advisable that the Secretary of the Treasury investigate the smaller ports to see whether they are skipping New York and trying to bring that in through the smaller ports.

Mr. HENRY. Could it come in through San Francisco?

Dr. WILEY. No, sir; they could not bring it in anywhere where we have an inspection service. But there is a lot of goods brought into St. Louis and Denver, and we ought to have an inspection in Galveston, where there is a large trade carried on. Those two laboratories we must have as soon as you give us the funds, and then we will have all the principal ports inspected. You understand that all the executive part of this work is done through the Treasury. It costs

your committee not a dollar. The only thing that it costs you is the chemical examination, which is very small compared with the magnitude of the interests involved. You always want some justification for the appropriations made, and I want to try to bring before you always, through my detailed statements, and also through the oral statements I make, that we are expending this money honestly and doing nothing for mere claptrap, but solely for the benefit of the people, the farmer, and the consumer.

There is one thing I want to call especial attention to. There is some little additional verbiage put in the bill this year. The courts of the United States decided that the Department of Agriculture was responsible for all charges for storage, cartage, and so forth, incident to the inspection of these foods, whether they were refused or not. Now, that saddled us with a large expense which we never expected, because, under the old regulations, the importer, under the regulations of the Treasury, had to pay all these charges. But they brought a case before the court, and the court decided that as Congress had made an appropriation for these expenses it was chargeable against that appropriation, which is pretty good law, I believe. Therefore we were saddled with a lot of expense for cartage and storage not estimated for in the bill. I think it is all right for us to pay all that where the goods are admitted.

Mr. HENRY. That is the language which is in italics in the bill?

Doctor WILEY. Yes, sir; that is what I wanted to call attention to. It is all right, I think, for the Department to pay those charges where the goods are found all right. There we have saddled on the importer an expense which we ought to pay; but when they are found all wrong it does not seem to me that we should have to pay for a man's perfidy; and this new language is put in to cover that point. It is only a regulation of existing legislation.

One other thing has cropped up since that was written. I want to call your attention to this little typewritten slip which I will pass around to all the members of the committee. Here is additional verbiage, which I want to put in at the same place. I will tell you the reason for this. We want to work in entire harmony with the Treasury, and are doing that and have had no friction at all so far, and we do not want any.

Under the existing regulations, when the invoice of goods is offered for imports, they may pay what they call a lump-sum duty, pending liquidation of the invoice and of duties, and then the merchant is allowed to take his goods, and he gives a bond always to the Secretary to pay any additional duties or charges, up to double the value of the goods. When this law went into effect the Secretary of the Treasury said to us that that bond would cover any possible contingency in our own Bureau, and therefore instead of holding up and sending to a warehouse the whole invoice we would let a merchant take his goods, under this bond, and if they were not found good he would return those goods to the Treasury. But what happens is that the merchant takes his goods and gives his bond and sells his goods all over the United States, and they are scattered far and wide. They are often sold before they arrive in this country.

Then when we say to him, "Your goods are not right, and you must return them," he says, "I have not got them; they are all gone." Then when we say to him, "Pony up your money under your bond,"

the law officials say, "Your bond is good for nothing; it only covers the duties, and as the man has not brought his goods into the United States without a duty you can not collect any damages against him." We ought to cover that point, and I have suggested the following verbiage:

Provided, That at the time of importation the Secretary of the Treasury may deliver at once to the consignee, under bond—

Which he is doing now—

of the full invoice value of the goods, the food products to be inspected—

That is exactly what he is doing now under the old law, so that this is no new legislation—

and if said products are found on inspection to be unsuitable for entry, said consignee shall return said products to the custody of the Secretary of the Treasury to be reexported or destroyed, according to the regulations to be made by the Secretary of the Treasury.

Those regulations are already made.

And in default of the return of said food products, said consignee shall forfeit to the United States the sum of money covered by the bond.

Mr. HENRY. That is supplementary.

Doctor WILEY. Yes, sir; of the regulations now in existence. This makes the bond cover the goods, which it does not do now.

The Treasury officials say that it is necessary to insert that before our bond could be sued upon. The action would lie without damage to the United States for failure to pay the duties, and, as the United States has received the duties, the United States has received no damage, and you could not collect on that bond.

It is highly important that we should not have to hold those goods ourselves. We would have to rent a lot of storehouses, and the consignees are entirely willing to hold the goods and return them if they are wrong. It would never occur again if they were wrong. They would say to the exporter abroad, "You send us fake goods, and we are done with you." This is not new legislation, but is a mere regulation of the present practices. With those added words this simple law seems to cover every possible contingency, and I believe will prove absolutely effective in protecting us against misbranded and adulterated and injurious goods coming from foreign countries. That is the object of this legislation.

This curious thing, I want to say, has happened. Our law says that anything that is forbidden entry to another country shall not be sent from that country to this country. I think that the construction which has been put upon that by a very distinguished law officer—I will not call his name—is certainly wrong. We submit all these questions to the proper authorities for interpretation, not being lawyers ourselves. We had this interpretation from the Department of Justice. This was the case we submitted. Germany forbids the importation into that country of any piece of meat that weighs less than 8 pounds, on the ground that it is not possible to properly inspect a piece of meat weighing less than 8 pounds. So I said, "We will not admit any German sausage where the pieces do not weigh as much as 8 pounds. We can not properly inspect that sausage. It is impossible. The Germans have that law, and they say that it is a good law."

I may say that it is a good law, too, and if you say that you will not allow a piece of meat weighing less than 8 pounds to go from this country into your country, we will say that we will not allow a piece of meat weighing less than 8 pounds to come from your country into this country. That question was submitted to the Department of Justice, and the answer was that we could not exercise that power, because the object of this law was not retaliation. But if you will remember that it was clearly brought out here that we did want to retaliate.

Mr. ADAMS. I do not see how they could render any such decision as that under the law.

Doctor WILEY. They did. I think it is very likely that the Attorney-General will reverse his decision, because it might help in obtaining some better trade regulations between Germany and the United States at the present time.

Mr. BOWIE. Is there any language that you could suggest putting in the bill that would obviate that?

Doctor WILEY. I can not think of anything much plainer than what you have in the statute now.

Mr. ADAMS. That decision is in direct antagonism to the language of the statute.

Mr. BOWIE. Would you mind reading again that provision that you have there?

Doctor WILEY (reading):

The Secretary of the Treasury shall refuse delivery to the consignee of any such goods which the Secretary of Agriculture reports to him have been inspected and analyzed and found to be dangerous to health or falsely labeled or branded, either as to their contents or as to the place of their manufacture or production, or which are forbidden entry or to be sold, or are restricted in sale in countries in which they are made or from which they are exported.

Mr. ADAMS. That is perfectly clear. That seems to be about as plain as language can be.

Doctor WILEY. I only called attention to this because you might think it strange if we had not exercised this authority in this year, and that is the only reason that we have not done it.

Mr. HENRY. You are still inspecting sausage?

Doctor WILEY. Yes, sir; and if they are artificially colored or contain injurious substances or come under any other provision of the law except that we have jurisdiction over them. We have refused cargo after cargo of sausages; but now the sausages are coming all right. They have no longer any preservative in them and they are no longer artificially colored; they are real meat, as sausages ought to be. But I would like to keep them out because they weigh less than 8 pounds.

Mr. COCKS. How is it that they can import sausages from Europe? Are the Germans peculiarly fixed so that their sausage is better than ours?

Doctor WILEY. We have a very large German population that are very fond of their own sausage, and most of it goes directly to our German fellow-citizens; and I have no desire to cut them off from their supply, provided their country will treat us fairly. But it seems to me the Americans abroad have as much right to eat American small meats in Germany as the Germans in the United States have to eat German small meats in this country.

Mr. COCKS. You do not know whether there is a very large percentage of that German sausage made here?

Doctor WILEY. I will say that a large part of the so-called "German sausage" sold in this country is made here. It is not necessary to go to Germany to get it. Of course, it is largely misbranded, and over that we have no control. The only objection that foreigners make against this law is that they say, "You discriminate against our foods in favor of your own," and they say, "The effect of it is to promote adulteration in your own country, because you have no control over the products in your country."

Mr. BOWIE. That is a bad state of business.

Doctor WILEY. I am very anxious for Congress to regulate the interstate commerce in food products.

Mr. BOWIE. Is it mainly for the reason you assign, or for the reason that in sound public policy you think it ought to be done? My notion is that the foreigner has nothing to do with that subject, and his view is not anything to influence us. The question is solely whether it is to our own advantage to have these regulations in this country and not whether the foreigner complains at it.

Doctor WILEY. I think it is for our own advantage. I think it would be an immense advantage to our fellow-citizens. I will give you another illustration. The Secretary of the Treasury informed the Secretary of Agriculture that to his knowledge a cider was imported from Germany to Rochester, N. Y., and there was relabeled and sold as German wine of high quality—as German champagne—and wanted to know whether he would forbid the sale of that product, which was falsely sold. We found that that cider was imported under its proper name and then we could not do a thing with it.

Then the Secretary wrote to the commissioner of agriculture of the State of New York, who executes the food laws in that State, and recited the facts to him, and said: "I think it would be a good thing if you could put a stop to this fraud under the laws of the State of New York." The commissioner replied: "The laws of the State of New York on food give us no control over beverages at all." That fraud goes on to-day, and they can ship that wine out of New York into the District of Columbia or any other part of the country without any legal restriction whatever.

Mr. HENRY. In your opinion, the pure-food bill pending in the Senate would remedy that condition?

Doctor WILEY. Absolutely; absolutely. And the one that Mr. Hepburn has before his committee, and which passed the House last year, would absolutely remedy that condition. Not interfering with the State laws, and not going into the State or interfering with the police laws, but the moment that the goods pass the State line this law would apply, just as it is now with custom-houses.

Mr. BOWIE. Going back to this question of retaliation, if I may call it so, upon the Germans—

Doctor WILEY. Yes.

Mr. BOWIE (continuing). In relation to the discrimination that they make as to the weight of meat; it seems to me that this statute could be broadened so as to relieve any possible ambiguity, and I suggest that you bear that in mind and see if you can not prepare an amendment to the effect that wherever foreign governments place restrictions upon the quantity sold that the same restrictions shall be

placed in this country against their goods. Now, there is nothing in this statute that I find that covers that specific matter, and I am inclined to think that the Department of Justice may have been right in their opinion.

Mr. ADAMS. It provides that in the event of any kind of discrimination—

Mr. BOWIE. That it shall be excluded altogether; but it does not say that the same restriction which they make there may be imposed here. We are not inclined to exclude it altogether, but it is simply proposing to exclude all under 8 pounds.

Mr. ADAMS. And that is a different proposition from excluding it altogether.

Doctor WILEY. I should like to see something in the bill so that the objection of the Attorney-General might be obviated.

Mr. BOWIE. Suppose that you confer with the solicitor over there and see if you can not make a suggestion along that line to us.

Doctor WILEY. I would be very glad to do that and send it up here.

Mr. BOWIE. Yes, sir; and send it up.

Doctor WILEY. I will be glad to do that.

Mr. BOWIE. I am inclined to think that the question of retaliation ought to be more definitely expressed than it is here.

Doctor WILEY. I believe that I have finished everything that is in the bill; and that is all, unless there are some questions.

Mr. HENRY. Unless the gentlemen of the committee have some questions to ask of Doctor Wiley, I think we have finished.

Doctor WILEY. I am very much obliged to the committee for their courteous hearing, which has extended over a great deal more time than I anticipated.

(Thereupon, at 11.50 o'clock a. m., the committee adjourned until to-morrow, Thursday, February 1, 1906, at 10.30 o'clock a. m.)

Statement submitted by Doctor Wiley.

	Salaries.	Supplies, etc.	Samples.	Travel.	Total ex- penses.	Appropri- ation.
LABORATORY FUND.						
Food division.....	\$17,690.28	\$10,580.23	\$155.60	.....	\$28,426.11	.....
New York port.....	5,593.32	2,418.21	923.79	\$726.25	9,661.57	.....
San Francisco port.....	1,017.34	1,106.26	.....	378.40	2,501.00	.....
Drug laboratory.....	3,600.00	2,154.04	22.26	156.06	5,931.36	.....
Micro-chemical laboratory.....	1,600.00	960.63	.....	6.00	2,566.63	.....
Nitrogen laboratory.....	2,437.00	1,432.01	.....	.....	3,869.01	.....
Insecticide and water laboratory.....	6,399.44	3,816.12	31.85	6.10	10,253.51	.....
Leather and paper laboratory.....	1,876.00	1,237.19	.....	95.40	3,207.59	.....
Dairy laboratory.....	2,600.00	1,550.01	14.25	.....	4,164.26	.....
Sugar laboratory.....	1,133.33	720.03	96.62	.....	1,979.98	.....
Plant analysis laboratory.....	2,600.00	1,652.10	.....	57.10	4,209.20	.....
Contracts, laboratory.....	4,950.00	2,976.06	.....	5.60	7,931.66	.....
Hygienic table.....	979.70	2,292.64	.....	.....	3,252.24	.....
Food standards.....	1,470.00	.....	.....	666.57	2,136.57	.....
Fermentation investigation.....	1,250.00	65.00	.....	74.19	1,389.19	.....
Miscellaneous.....	1,275.00	433.67	.....	206.09	1,914.76	.....
General office.....	15,015.66	1,630.67	.....	60.20	16,706.43	.....
Laborers and machinists.....	6,286.73	2,511.45	.....	.....	8,798.18	.....
Total.....	77,782.80	37,435.12	1,244.37	2,436.96	118,899.25	.....
Balance.....	.....	.....	.....	.....	900.75	\$119,800.00

AGRICULTURE APPROPRIATION BILL.

Statement submitted by Doctor Wiley—Continued.

	Salaries.	Supplies, etc.	Samples.	Travel.	Total ex- penses.	Appropri- ation.
SIRUP FUND.						
Sirup investigations	\$4,627.89	\$9,782.73	.....	\$572.74	\$14,983.36	.....
Balance.....					16.64	\$15,000.00
ROAD MATERIAL FUND.						
Division of tests	12,250.25	2,391.69	.....	111.60	14,753.74	.....
Balance.....					246.26	15,000.00
Total appropriation.....						149,800.00

*Financial statement of the Bureau of Chemistry, United States Department of Agriculture,
January 26, 1906, for fiscal year ending June 30, 1905.*

LABORATORY FUND.

Salaries.....		\$77,782.80
Requisitions:		
Apparatus	\$18,889.12	
Chemicals	5,410.59	
Machinery and hardware.....	2,511.45	
Office supplies	1,630.57	
Miscellaneous	864.38	
Lumber	115.44	
		29,421.55
Rent		2,800.00
Gas and electricity		786.58
Telephone and telegraph		65.74
Freight and express		988.90
Letters, travel:		
Food standards committee.....	\$666.57	
H. W. Wiley, miscellaneous	187.64	
H. W. Wiley, to ports.....	287.60	
F. P. Veitch	95.40	
C. C. Moore	57.10	
L. F. Kebler.....	155.06	
B. R. White	9.65	
L. M. Tolman	96.10	
A. L. Pierce	60.20	
R. E. Doolittle.....	12.10	
W. B. Alwood	74.19	
Geo. P. McCabe.....	18.45	
L. S. Munson	5.60	
B. J. Howard	6.00	
W. D. Bigelow.....	417.55	
B. H. Smith	6.10	
J. W. Wheatley.....	281.65	
		2,436.96
Miscellaneous letters:		
Hygienic table	2,292.54	
Imported food samples.....	323.79	
Dairy samples.....	14.25	
Insecticide and water samples.....	31.85	
Food samples	41.84	
Sugar samples.....	96.62	
Miscellaneous letters.....	226.22	
Whisky samples.....	113.76	
Drug samples.....	22.28	
New York laboratory	48.75	

Miscellaneous letters—Continued.

San Francisco laboratory	\$429.39	
Charlottesville, Va	65.00	
Castings and triers	312.45	
		\$4,618.72
Balance		900.75
		\$119,800.00

This balance will be reduced by some accounts not yet presented for foreign samples.

SIRUP FUND.

Salaries	\$4,627.89	
Supplies and equipment	4,721.53	
Contracts	5,633.94	
Balance	16.64	
		15,000.00

ROAD MATERIAL TEST FUND.

Salaries	12,250.25	
Supplies and equipment	2,188.74	
Letters:		
A. S. Cushman	70.45	
L. W. Page	41.15	
Castings	196.09	
Freight and express	7.06	
Balance	246.28	
		15,000.00
Total		149,800.00

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Thursday, February 1, 1906.

**STATEMENT OF MR. MILTON WHITNEY, CHIEF OF BUREAU OF
SOILS, DEPARTMENT OF AGRICULTURE.**

The committee met this day at 10.40 o'clock a. m., Hon. E. Stevens Henry in the chair.

Mr. HENRY. Mr. Wadsworth, the chairman, has notified me that he will be here presently, and that he would be glad if we should go ahead with the hearings. Professor Whitney is with us this morning, and we will now hear him.

Professor WHITNEY. I think, if you please, we will pass the salary part of your section of the bill until Mr. Wadsworth comes.

Mr. HASKINS. There is no increase asked for, none submitted, as I understand.

Professor WHITNEY. There is one position asked for. There is only one change in salary—one clerk at \$1,800.

Mr. HENRY. I think we will pass that until Mr. Wadsworth comes in. We will now hear you, commencing with the investigation in relation to soils and so on, and hear of the work you were doing last year.

Mr. WHITNEY. Mr. Chairman and gentlemen, I presume you would like to know what we used our appropriations for, and I will give you the allotments that we are working under for this present year. The

administration bureau, the clerical help, and the expenses pertaining to headquarters in Washington are estimated to cost \$45,492; for our laboratories, about \$22,000; for the soil survey, \$72,487; for the tobacco experiments, \$24,420, and for our new line of soil management, \$19,000. For our alkali work—

Mr. HENRY. You say for your new line?

Mr. WHITNEY. New work that we have been working up to for several years. But it has now grown into a well-formed division. For our alkali reclamation the allotment is \$11,670; and for the work on soil fertility, \$7,873, making in all a total appropriation of \$204,660 for the Bureau of Soils.

Mr. HENRY. That is an increase?

Mr. WHITNEY. No; we had no increase last year.

Mr. LAMB. What page is that?

Mr. HENRY. No; it is a decrease from last year.

Mr. WHITNEY. A decrease of \$10,000. Answering the other question, that is under the Bureau of Soils, on page 28 of the bill.

Mr. HENRY. It is page 30. The difference in the amount under Bureau of Soils is a little over \$32,000.

Mr. WHITNEY. No; on the bottom of page 30, Bureau of Soils, including statutory salaries, the amount appropriated for the fiscal year ending June 30, 1906, which is the year we are working under, is \$204,660.

Mr. HENRY. You are asking now for \$236,000 for the next year?

Mr. WHITNEY. Yes; I beg pardon; we are asking for an increase of about \$31,000.

Mr. HENRY. Yes, about \$31,000. Can you tell us why you want that, as you go along?

Mr. WHITNEY. Yes. In the mapping of soils in the soil survey we have surveyed this past fiscal year 24,613 square miles.

Mr. HENRY. Where have you done that? I suppose you will tell us later.

Mr. WHITNEY. We have forty-five areas. I do not know that I have a list here.

Mr. HENRY. Let it pass then.

Mr. WHITNEY. That work was divided into forty-five areas, and we have continued to work as we have in the past in the Northern States during the summer and the Southern States during the winter. The parties are out now in the Gulf Coast States and remain constantly in the field. We have divided the work up as a matter of convenience.

Mr. HENRY. You have twenty-two parties now?

Mr. WHITNEY. No; only twelve parties. With our present appropriations, you see, we had to cut down last year on account of the cut in our appropriations of \$10,000, and we lost two or three field parties.

Mr. HENRY. How many have you now?

Mr. WHITNEY. Last summer we had fourteen, and at times fifteen parties.

Mr. HENRY. That is all?

Mr. WHITNEY. That is all we can handle now.

Mr. HENRY. I thought you had twenty some.

Mr. WHITNEY. That was for part of the year; but we can not maintain the force at that, although we think it ought to be maintained at twenty parties right along.

Mr. LAMB. You want this increase for soil survey?

Mr. WHITNEY. Yes.

Mr. LAMB. And for determining fertilizers?

Mr. WHITNEY. Yes; I will take that up in a moment. The cost of the work in the soil survey has increased slightly. It is, however, only \$2.59 per square mile. That is the cost in the field. A slight additional cost has been due to the length of time the men have been in the service, somewhat higher salaries necessarily having to be paid to them, and also some increase of cost has been occasioned by the character of the season. Last winter was a very rainy season, and we lost a great deal of time; and of course that counts on the cost per square mile. Transportation and supplies and other expenses amount to 20 cents per square mile. The average total cost per square mile was \$2.80, but part of that was borne by State organizations, so that the average cost to the Department of Agriculture was \$2.60 per square mile.

Mr. LAMB. For the soil survey?

Mr. WHITNEY. Yes.

Mr. LAMB. That is remarkable.

Mr. WHITNEY. That is something less than half a cent an acre; and that covers all the cost of the work, including office work, preparation of maps, preparation of reports, and actual work in the field.

We have adopted another policy also that has tended to cheapen the publication of the work, which is not a matter, however, that you are primarily interested in, but we have found it advisable to work larger areas and take up fewer of them. Three years ago the demands for the work were so strong and numerous that we attempted to satisfy as many as we could by working small areas—200 square miles—but we found that the increased number of maps increased the cost of printing. We have adopted, therefore, the policy of working larger areas, usually a county at a time, and we have found it very satisfactory to take the county as a unit. It is a political organization; it is an area in which people are interested, and it gives us an arbitrary boundary line which is very satisfactory.

Mr. HENRY. What is about the average area of a county?

Mr. WHITNEY. The average area of a county, I should say, is about 800 square miles.

Mr. HENRY. About four times the size of your former areas?

Mr. WHITNEY. Yes. That makes the cost of a soil survey of a county from about \$1,500 to \$2,000, and it costs nearly as much to publish the reports as it does to do the actual work.

It is beginning to be realized very strongly that one of these soil survey reports showing roads, railroads, cities, towns, and villages, and the distribution of the soils with reference to these objects which people can locate, are a very cheap form of showing the resources of a county. In other words, if we may put it so, it is a very cheap way to advertise the resources of a locality.

Mr. LAMB. Yes, there is a good deal in that.

Mr. WHITNEY. Three thousand dollars expended by the Government gives them a road map and a soil map where they can see what their opportunities are in agricultural development.

Mr. LAMB. Where will you give us more soil surveys in Virginia? They are writing me every day about it.

Mr. WHITNEY. I think that is a question you want to ask the committee.

Mr. HASKINS. Not until after he has been up in my State. He has not been up there at all.

Mr. COCKS. We want Long Island finished before anything else is done.

Mr. DAVIS. You have not touched Minnesota yet at all.

Mr. WHITNEY. The time is opportune.

Mr. LAMB. I will send copies of this record to my people, and that will answer many a letter. They will see that I am after you.

Mr. WHITNEY. We need more men, more parties, more money to do this work. We have now twelve parties. We can not supply the demand from the South. We have forty requests from the State of Texas alone, and they are all backed up by Congressional indorsement. It has come to the point where we can not exercise any discretion at all.

Mr. LAMB. The dean of the faculty is sitting over there smiling now.

Mr. FIELD. I thought you promised first to finish up the work in Texas, and then take up the rest of the United States.

Mr. HASKINS. How long does it take a gang of your men to complete a county?

Mr. WHITNEY. We work very steadily, at the rate of 100 square miles per month. It will vary from that according to the character of the seasons and the character of the roads; but we would assign for a county of 800 square miles a party of 2 men for about six months.

Now, in the Western States, in the prairie States, we can often do much more than in the valley areas, where the soils are locally mixed up. In the latter areas it takes much longer; but that large area in the Connecticut Valley we did in one season, and in the State of Rhode Island we finished it, a small State of 1,000 square miles, in a season.

Mr. HENRY. You took the entire State of Rhode Island?

Mr. WHITNEY. Yes; but we could not have done that if Mr. Williams had insisted on his amendment and gotten it in limiting it to a third of a State.

Mr. HENRY. He would probably have excepted Rhode Island if he had been asked to.

Mr. WHITNEY. We finished Rhode Island in a season. We finished all of Long Island for which there were maps with a party of two men; and I may say that in speaking of demands for this work the demands for the Long Island survey have been unprecedented. In making that survey without thinking we extended the soil colors as well as we could over the city of Brooklyn, so as to make the map uniform. That involved us in the necessity of supplying a quota for each Brooklyn Congressman, and I was quite alarmed when I found that that brought the edition up to 30,000 copies of advance sheets. As soon as the report came out there was a very large demand for it. The Department's quota of 1,000 copies was quickly exhausted, and we had demands from the Brooklyn Congressmen for additional copies, if we could spare them from our own quota. I have been reliably informed that the whole situation has been canvassed, and the edition has been entirely exhausted six months after it appeared. We ourselves have not a copy of the Long Island sheet except our office file, and still the demand is continuing.

Mr. COCKS. I would like to have 500 right now.

Mr. WHITNEY. It is a very good piece of work, but no better than many of our other surveys. This one has simply taken the fancy of the people.

Mr. COOKS. Is it not one of the hardest sections to do?

Mr. WHITNEY. Yes; one of the hardest sections, and I put my ablest men in charge. We were not able to extend it to the eastern end of Long Island because of the lack of maps. The Geological Survey is at work on the maps, and they promised to have them available in a short while, but they were not ready when this survey was made and we had to quit; the season ended and we published what we had.

Mr. BOWIE. Is there any provision of law under which you can increase the number of publications of that character when you find an absolute need for them?

Mr. WHITNEY. No; the Department has no right either to increase or decrease the number of copies of a publication of a Congressional document of this kind; and I will say right here for the information of the committee that in the hearings before the Printing Committee about two weeks ago, I made a recommendation that the Congressional quota of the bound report be abolished absolutely and that the Department be allowed to supply Congressional requests, for we are doing it now. Each Congressman, I think, gets only eight or twelve copies of the bound report, and I do not believe that one out of a hundred ever notices that he has those to his credit, and when requests come to him he sends them to us. We comply with them, of course, because we do not know whether his quota is exhausted or not.

Mr. BOWIE. You comply as long as you have them?

Mr. WHITNEY. Yes; and the consequence is that there are thousands of those bound copies stored in the House folding room. Our supply is exhausted, and we would be glad to get them if we could.

Mr. BOWIE. I would like to make you a present of those I have.

Mr. LAMB. You can transfer them to anybody you choose. Transfer them to him.

Mr. WHITNEY. You have only about sixteen.

Mr. BOWIE. I do not know how many I have.

Mr. HENRY. The Bureau can not very well solicit individual Congressmen.

Mr. LAMB. A Congressman can assist the Department, though, and assign them to the Department. A Congressman can give them to anybody he chooses.

Mr. CROMER. What are they?

Mr. WHITNEY. The bound volumes of the field operations.

Mr. CROMER. The foreman of the folding room says he has wagon loads of them.

Mr. WHITNEY. We are distributing those on the request of Congressmen constantly.

Mr. LAMB. The superintendent of that folding room will tell you there are lots of other things which the Congressmen burden him with.

Mr. BOWIE. They will accumulate there in increasing quantities forever, because there will be some men who will not send out the documents, no matter how valuable the publications are. But those bound volumes, I can understand, might be useful for libraries and particular individuals, though they are not fit for general circulation.

Mr. WHITNEY. The advance sheets answer that demand.

Mr. BOWIE. That ought to be extended, and the other cut off.

Mr. WHITNEY. Let us have the distribution of the bound report, and we can distribute it to better advantage and supply the Congressional demand.

Mr. HASKINS. We can transfer them to you from the folding room.

Mr. BOWIE. The Department may fail or hesitate about making requests.

Mr. WHITNEY. The same thing holds in the case of the Yearbook. There are a hundred thousand copies of the Yearbook—I can not tell you the date, but it is a recent year—a hundred thousand copies in the House folding room. The Department's quota is exhausted. We are constantly refusing to send out additional copies, and we know that large stock has accumulated up here.

Mr. LAMB. I would like to have them transferred to my stock. I can not get enough.

Mr. WHITNEY. Congressmen simply fail to send them out.

Mr. CROMER. The Yearbook is appreciated, Professor, but the other book you speak of is not. I sent mine out, and I never received any comments about it, or any thanks, or anything else.

Mr. WHITNEY. The experience of the Department is that the bound report on the soil survey is appreciated. We have a great many requests for that. The requests for the reprint are quite regular, about a thousand a month, and the requests for the bound volume are so great that we have to exercise care in its distribution in order to maintain a sufficient number so as to meet the necessary demands on the 6,000 copies that we get. And here is the important thing, that if any edition of that is exhausted there is no possibility of getting a reprint. It is already printed. It is done. It is finished. The demand for the soil survey of Fresno, Cal., which is in the second volume of the field operations, is just as strong now as it ever was. The lands are the same, the conditions are about the same, and people going into the Fresno area want that Fresno map. Whether it was published in the 1899 report or in the 1904 report it is just the same. The demand is steady, and we have to keep on hand a considerable number of these bound volumes after the distribution has taken place.

Mr. LAMB. Can you suggest some way by which we can divert from the Congressmen to your Department all those extra copies?

Mr. WHITNEY. I think that rests with the Printing Committee. They have this matter under consideration now, I believe.

Mr. CROMER. There is a proposition to transfer all in the folding room to you.

Mr. LAMB. That would not only accommodate you, but would relieve the folding room.

Mr. WHITNEY. Mr. Hill has appeared here year after year before the Printing Committee, recommending that at the end of a year a redistribution be made of documents coming from the Departments, and 50 or 75 per cent of all the publications remaining on hand should be turned back to the Departments from which the report emanated and be redistributed. After the second year the whole thing should be turned back to the Department.

Mr. HASKINS. You see, members from city districts receive the same number for distribution as we of the country, and they have not occasion to use them to a great extent. As to my 913 volumes of the Yearbook, I had occasion to send all of them out, and then I had to go to Senator Proctor and Senator Dillingham for additional copies, the demand was so great.

Mr. CROMER. You mean in the city districts?

Mr. HASKINS. No; I represent the country.

Mr. CROMER. They appreciate them in the city also.

Mr. LAMB. I can testify as to that. I got two requests for the Yearbook this morning.

Mr. WHITNEY. In regard to the report on the field operations, the requests for bound copies come to the Bureau, to the Department, and the Secretary. It is identified with the Department rather than with Congress, and we are much more likely to get the requests than Congressmen are.

Mr. HENRY. I doubt if there would be any serious objection in the House to your books all being allotted to the Department, with the understanding that members could apply to you.

Mr. WHITNEY. That would cut off 4,500 without distributing the advance sheets. It would leave 6,000 with which we could supply the Congressional demand and our own demands.

Mr. HENRY. The Yearbook is another proposition.

Mr. BOWIE. The forfeiture of a portion of the Yearbook of a certain date might possibly do, for a year or two; but I do not think they would ever consent to it entirely or permanently. I try to keep a certain quota of mine undistributed purposely.

Mr. COCKS. Under this plan you suggest, Professor, members could get them from the Department?

Mr. WHITNEY. Yes; they could get them from the Department. Under this plan, Mr. Bowie, if the 100,000 copies of the Yearbook now in the folding room were turned back to the Department you could get them from the Department, whereas now you do not know who has them. The 100,000 copies are locked up from you just as effectively as they are from me.

Mr. HENRY. They are all allotted to individuals now?

Mr. WHITNEY. Yes; and you do not know who has them.

Mr. BOWIE. I could only get them from you while they lasted with you?

Mr. DAVIS. The energetic members would get all there were from the Department.

Mr. WHITNEY. The report of the soil survey of a county covers, as you probably all know, a very brief statement of the geology, climate, the derivation of the soil, and then as full a description as we can give of the soil itself, and of its crop relations—the best crops adapted to it, the farming conditions, and suggestions as to improved methods which might be introduced or which are in actual use in other localities upon which our men have entered. We have added to this this year a new feature; that is, a statement of the fertilizer requirements of the soil. It is one of the most important lines of work the Bureau has taken up, with methods which have been devised and tested at a number of experiment stations, and it has proved to be very satisfactory as a method of determining the manurial requirements of the soils; and we are following our survey parties up with this new line of determining the manurial demands of the soil.

Mr. CROMER. As to quantity and quality of fertilizers needed?

Mr. WHITNEY. Yes; as to the quantity and quality of fertilizers needed for different crops.

Now, if I may turn again to this question of the demand for soil surveys, they are getting so heavy that I am very seriously embarrassed

as to how they can be distributed. We have now enough requests on hand to keep our entire force employed for five and a half years, and it rests with me, after a consultation with the Secretary, to weed out some of those requests. A great many of them have to be deferred—have to be left over. We have many more requests directly from Representatives and from Senators—we have requests also from associations, resolutions indorsed by Senators and Representatives—than we can handle, and it has come to a point where it is very unpleasant for me to meet some of the Representatives, because I have been so long putting them off.

Mr. BOWIE. You make no personal allusion by those gestures?

Mr. WHITNEY. No. He [indicating Mr. Lamb] has just charged me with having neglected him.

It seems to me to be wise to bring the number of soil survey parties up to the full limit of twenty parties actively at work in the field. It will require at least that number to keep up with the demands that are coming in. Let me see that map.

[A colored map showing distribution of soil surveys was produced by Mr. J. A. Bonsteel, in charge of soils, Department of Agriculture.]

I would be very glad to have Mr. Bonsteel, who is in charge of the soil survey, explain to you later on some of the uses that are being made of the work. To the right here [indicating on map] I have in black some of the areas we have surveyed, and in red the areas for which there are pressing and strong requests; and you will doubtless find many left off from there, because we put on only the areas from which we had heard up to the date of making that map.

Mr. DAVIS. I do not see my district there, although it is in the center of the world. I see now the benefit of being a small State—a small borough like Rhode Island or Connecticut. [Laughter.] In such States you can have your entire State worked out, whereas if you have a large territory like Minnesota you must wait.

Mr. COCKS. We know it is all right out there, and there is no question about that.

Mr. HASKINS. Before you get through, Professor, I wish you would describe the methods of soil survey from its inception to its completion, so that you can get it in the record.

Mr. WHITNEY. Yes. I will be very glad if you will hear Mr. Bonsteel on that. He has it all in mind. The urgent demands for the soil survey have gotten beyond the mark where I can satisfy people by promising to take them up at the first opportunity.

Mr. LAMB. What are the States doing themselves as to that?

Mr. WHITNEY. Very few of the States are doing anything. Illinois is doing some soil-survey work, but they have come to recognize very clearly that the soil survey is a national undertaking. In order to correlate the soils, in order to be sure that the soils on which they are raising truck in Maryland and Virginia and at Charleston, S. C., are the same, in order that we may be sure that we know how these soils run, so that we can follow out our industry in the proper line, we have to disregard State lines. For the main work of the soil survey in so correlating the service, in arranging the soils in groups, according to their origin and crop values, the National Government has to do that, as it has had to do in regard to the Geological Survey. But after we have established the main soil types, after we have shown that this limestone soil [indicating] runs across two or three States, and that

this prairie soil [indicating] has identical features that run down through two or three other States, the States themselves can do more detailed work than we are doing, and can map the fields and acres where a crop has the smallest unit, a 10-acre piece. We are not attempting to do the work in detail, as the States will eventually want it done, just as the Geological Survey is only outlining the area of the coal measures, while the States themselves are investigating the particular value of the several parts of the coal measures.

Mr. LAMB. Are the mechanical and agricultural colleges doing anything in that line?

Mr. WHITNEY. They are cooperating with us as far as they can, but they are not equipped for this work, and they can not do it ahead of us. They are coming in to support our work with more details.

Mr. LAMB. I do not see how they can do it. They have not the apparatus.

Mr. WHITNEY. No; they have not the apparatus, nor the men, nor the means.

Now, Mr. Chairman, the number of men on the soil-survey force is 32. With that number we can organize a maximum of 16 parties in the field. But you will understand that in an organization of this kind, where the men are constantly in the field and constantly traveling, we have to bring them in for a short time to Washington to prepare their reports—to bring out features in their official reports which, while in the field, they can not write out or make clear—and in order to get them in touch with the spirit and development in the Bureau itself it is necessary to have them in every year or two years for a period of one or two months, in order that they may get in touch with the Bureau.

Then the work has come to a point now where we have covered so large an area of the country, where we have so worked in every corner and crevice of the several States, that we have got to pay more attention than ever before to a proper correlation of the soils; when we have got to be sure that the soil in the Connecticut Valley is like or unlike the soil in some other part of Connecticut. That depends upon the judgment of the men, and to that end I want two inspectors to take charge of that work of inspecting the work of the soil-survey parties, to see that their work is going along properly, and especially to see that the correlations that they make of the soils agree with what the Bureau thinks in seeing the entire country—in seeing all the soils. That is the best that can be done.

Now, in submitting the appropriation this year, I may say that personally I wanted to ask and did ask for more than was estimated by the Secretary, but he felt that in view of the cut in our appropriation last year, it would be best to cut down my estimate considerably. So he cut them in half.

That was the starter; so that I have recast my figures, and I have come before you to-day to ask for an addition of \$10,000 for the soil survey. That will give us two inspectors at \$1,600, two new field assistants at \$1,000 each, and additional expenses of \$1,800, and that will enable us to inaugurate the very necessary inspection of the work and to put out one additional party. That, I think, is a very moderate request—for one additional party where, in my judgment, we ought to have four or five.

Now, leaving for the present the subject of the soil survey, I would like to say that the tobacco work has been in the main very successful; that is to say, we have succeeded in raising a product in Texas that approaches closely the Cuban type of tobacco, with the Cuban aroma. We have submitted a great many samples of this to the trade; we have sent it to cigar manufacturers and leaf dealers, and while we have letters both for and against it, we have a great many letters with very favorable comments from persons upon whose judgment we can rely which satisfy us that the tobacco does meet the requirements of the trade.

So far as demonstrating our ability to grow a good tobacco with a good aroma in this country goes, we have finished. The Department could now withdraw from Texas and Alabama and feel satisfied that we have raised the finest leaf for cigar filler that has been produced in the United States. But the farmers have not yet taken up this industry. Cotton is up in price now. They do not want to go into a new industry, which is uncertain to them because it is new. We have remained there, hoping that they would in time take up the industry. We have interested the commercial men in the enterprise. We sold leaf tobacco in a bundle last year for the farmers for 15 cents a pound. Mr. McNess, our tobacco expert, is here with some interesting figures as to what has been done, and if you care to hear him after I am through, I think you will be interested in learning from him at first hand what has been accomplished.

But in response to the inquiries so often made of bureau chiefs by the committee, "When are you going to finish your work?" I will say we have finished our work now; but if we withdraw now the industry will not be established. We have got to remain in Texas and in Alabama for a reasonable time, until they can get their breath and catch hold of the methods we have introduced for this new crop and adjust themselves to these new conditions, which we tell them can prevail there, and build up a new industry.

Mr. LAMB. I am sorry the chairman of the committee is not here to hear that you have finished one line of inquiry.

Mr. COCKS. There was a string to that, though.

Mr. FIELD. In reference to that completed work, particularly in Texas, it has been demonstrated in a number of counties, for instance, San Jacinto and Grimes and Walker counties, and elsewhere in that section. But have you completed the work sufficiently to say that you have completed it in the State of Texas?

Mr. WHITNEY. Oh, no; I have explained only that we have grown a leaf there. That is the object of the Department. We have not shown how far that can be grown. There are other areas, as, for example, Lee County, Lavaca County, and other areas, that we have reason to believe will give good results upon investigation, and we are going to stay there by permission of the Secretary and of the committee, and are going to extend our work over those other areas, hoping all the time that the railroad interests and the business interests that are actually trying to get this industry started will succeed either in getting the men who are there aroused to the importance of the subject, or in bringing in new men to take up this work.

Mr. FIELD. Don't you find an increase of interest from year to year in that industry? I have many more inquiries of late than I had last year. I have vastly more inquiries this year than last.

Mr. WHITNEY. Of course there is this that must be remembered: That industry, that leaf, is only going to be successful in a certain class of soil—with Orangeburg soil; that has been proved beyond question by the work of the Bureau, and by the failures that the Texas industry has already experienced. The revival of the industry in Texas is going to depend entirely upon the selection of those red Orangeburg soils and the intelligence with which the crop is cultivated by the farmers.

Mr. FIELD. What is the particular description of that Orangeburg soil; is it a clay subsoil?

Mr. WHITNEY. It is a red sandy clay. We have operated in two counties, Anderson and Lee counties, and we have mapped a few counties where that has been found, Lavacca and others, so that we have the situation well in hand; and I do not think for a moment that the Department should leave that, although I want to clear myself of any imputations by stating that, so far as the demonstration work is concerned, the Department is finished. We have produced a fine leaf.

The same situation may not show in the Connecticut Valley. We have been severely criticised for failures that have occurred in the Connecticut Valley. There is no question but that much money has been lost, but it has been lost because they have not followed our methods. They thought they knew better than we did. They have gone out and tried to sell their tobacco directly to the manufacturers. They have consulted the ordinary channels of trade, and they have encountered a vast amount of opposition and criticism. We have remained constantly in the Connecticut Valley. We are producing now a much finer leaf than we did before. We are improving the quality of the leaf, and the results are showing in the ready sale of the product.

Mr. McNess has figures to show the prices that are being obtained for that leaf. But we are working against tremendous opposition.

Mr. HENRY. Permit me to make a remark right there, not to interrupt you: That is, that Professor Whitney is absolutely correct in his statement. From my own knowledge he is absolutely correct. The Department has done invaluable work there, but the effect of it has been largely destroyed by irresponsible promoters, and perhaps by the disinclination of tobacco growers to benefit as much as they might by those improvements that have been suggested.

Mr. FIELD. What seed is used in Texas? Is it altogether from Cuba?

Mr. WHITNEY. Yes; from Cuba.

Now, in the Connecticut Valley, so far as the production of a wrapper leaf is concerned, we have produced the most perfect wrapper leaf that has been grown in that State. There is no question about that. There is criticism that we have made it a little too thin. Why, gentlemen, when we took hold there they were raising a fine wrapper, an outside wrapper, but it was so coarse in texture and the veins were so large that they could only get two wrappers or, at the utmost, four wrappers in a leaf that was from 26 to 30 inches long. But we have got the leaf down to where they say it is a little too thin. It is much better to have erred on that side. It is better to have found we can get it too thin than not get it thin enough. If the growers want that leaf made thicker, I do not see that there will be any serious difficulty in opening it up.

Mr. ADAMS. Does it produce as thin a leaf as the Sumatra leaf?

Mr. WHITNEY. They claim it is thinner. They want it thicker.

Mr. HENRY. It will wrap 25 per cent more cigars, but it is a little too thin. It will not wear well. But, as Professor Whitney says, that is something that is very easily remedied.

Mr. WHITNEY. That is the only criticism now, and we keep working on the thing and we can get just what we want, so that I say that while we have finished our work in one sense we can not afford to leave it until they get the industry fully established. We were ready to go three years ago. Three years ago I had orders prepared transferring the party from Connecticut to New York, at the urgent request of the tobacco growers of the Baldwinsville district. After the orders were written and while they were on my desk to be signed the situation changed in the Connecticut Valley, and presentations were made to me of a condition which made it absolutely impossible for us to leave without appearing to admit defeat, and as that is not in my composition, I changed the orders and had the party remain, and we have stuck by that industry, although it got down to a point where it appeared practically to have died. But it has not died. There is no reason why it should die, and we are going to show that the finest wrapper leaf can be produced in the Connecticut Valley and in Florida, and just as fine in Florida as we need on our domestic cigars.

Now, we have had equal success in our work in Virginia. We have not been there so long. We have not accomplished so great a change, but we have done a very successful piece of work which you, Mr. Lamb, will probably be interested in hearing Mr. McNess speak of.

Mr. LAMB. I have no doubt of it.

Mr. WHITNEY. We have shown that in those export types of tobacco we can produce a larger number of good wrapper leaves than the farmers themselves get. We have shown that we can double the yield, or nearly double the yield, by the use of commercial fertilizers on a scale which they have never dreamed would be profitable. We have made an investment in fertilizers alone amounting to more than the cost of their original crop, and have shown them that they could make a larger profit even after meeting that increased cost than they did before. Those are things that we are showing the Virginia farmer.

Mr. ADAMS. This is in connection with the soil survey?

Mr. WHITNEY. Yes.

Mr. ADAMS. When you use commercial fertilizers, do you use them in a general experimental way, or because the analysis of the soil indicates a lack or a superabundance of certain elements, and base your use of commercial fertilizers purely upon your analysis?

Mr. WHITNEY. No; we make no chemical analysis of soils. We are using as a guide for our own work this method of manurial requirements, the wire-basket method, that I will speak of later—one of our new lines of work, and it is giving a great deal of success.

Now, Mr. Chairman, in regard to the development of the tobacco work, I want to say that there is just as much demand for an extension of our tobacco work in its way as there is for the soil survey. We have had very strong demands from New York, from Pennsylvania, from Wisconsin, from Kentucky, and from Tennessee, and for an extension of the work in Virginia; and I have asked during my several hearings before the committee that the appropriation be increased so that we could extend the work we are doing in some of those other areas.

Very recently the demand for the work in New York has become very strong. I say recently. It has been so for three or four years, but they have filed petitions with us now, and they have become very insistent that we help the New York farmers. They are in this very unfortunate position. It is a large tobacco State, with the headquarters at Baldwinsville. It has been an important industry in the State, but it is not a crop that has a decided value, as is the case with the Pennsylvania crop on one side, which is a filler crop, and the Connecticut crop on the other side, which is a wrapper crop, and the Wisconsin crop on the northwest, which is a binder crop. The New York growers are in a quandary. Those three States have specialties, but New York produces not only good wrappers but good binders and good fillers, and the thing seems to be mixed up so that they do not know where they stand. They do not know which of these industries they can extend, and they want help. They are in a tangled condition. The industry has suffered in the last few years by the strides which Connecticut, on the wrapper side, has been making, and by the strides which Pennsylvania and Ohio have been making on the filler side. The New York tobacco farmers have appealed to us for help, and I urge very strongly that the committee increase our appropriations so that we can put at least one additional party out, which I think should go to New York, although Pennsylvania wants it and Wisconsin and Virginia want it. I am going to ask for an additional \$5,000 for a tobacco party for the State of New York.

In regard to the reclamation work that I have been doing in the West, I want to say that this work has also been successful. The Bureau of Soils has been organized along rather intensive lines. We have thrown our energies on to such soil problems as seem to render themselves easy of attack. One of them has been the reclamation of soils that have been ruined or threatened by the rise of alkali in the West.

At Fresno, Cal., alone, there was a depreciation in property values of a million dollars from the rise of alkali on soils which showed no signs of it before they were taken up, and the central colony, which was the first settled, has been almost entirely abandoned. The beautiful vineyards and orchards have gone, because of the rise of alkali, which might have been foreseen if we had known more of the nature of the subsoil before the settlement took place. Not only so, but alkali threatens many other sections of the country, and it is a very proper thing for the Department to investigate the cause of the rise of alkali and the proper methods, or best methods, to be used for protection against it.

Mr. BROOKS. Well, Doctor, is it not in the main due to injudicious irrigation?

Mr. WHITNEY. Very largely.

Mr. BROOKS. And therefore would not one very efficient way of averting that evil be to give more attention to irrigation methods?

Mr. WHITNEY. That is being done by the Irrigation Office, and we are confronted—

Mr. BROOKS. Too much water sets loose the alkali lower down in the soil. It is a simple matter not to irrigate so much.

Mr. WHITNEY. We are confronted with the unfortunate predicament of finding these soils already ruined, and with the disinclination

of people to be moderate and temperate in their habits of irrigation as in their habits of drinking.

We have completed the work on the Salt Lake tract to the extent that we can grow crops there. The area there was out on the flats, a few miles from Salt Lake City, and we started with a piece of land that had 3 per cent of alkali to a depth of 4 feet. We have reclaimed that now so that crops are growing on it—profitable crops.

Mr. BROOKS. How much of an acre cost was it when you got through with it?

Mr. WHITNEY. The cost of underdrainage was between \$16 and \$20 an acre. Now, the processes since then have been carried on as a farmer would carry them on. We have thought it necessary to be thorough in our investigation in order to learn all we can, and we have learned a great deal about methods of irrigation.

In Fresno we made a mistake. It was a costly mistake. We have repaired that mistake. That is, we put the drain a little bit too shallow; there was hardpan under the soil that had not appeared when we first made our examination. Conditions change rapidly. That is a very fine silty soil, and, as a result of our work, we have found now the methods—the proper methods, as we believe—for the removal of the alkali at Fresno, not as we at first put it out, but as we now know that we should have put it out.

We know the conditions at Salt Lake City, and at Tempe, Ariz., and at Yakima, and at Billings; and with the experience gained at these five localities, in which we have steadily worked until we have reclaimed the alkali, we now know how to advise the reclamation of alkali lands in those localities without incurring the expense that we have been put to.

Mr. BROOKS. A cost of \$16 to \$20 an acre would be pretty near prohibitive, would it not, on a large scale?

Mr. WHITNEY. The same soils we are working on at Fresno now, upon which we have spent \$20 an acre for underdrainage, were selling for from \$200 to \$500 an acre in fruit. It will certainly pay to reclaim such land as that.

Mr. BROOKS. I limited what I said by saying “on a broad scale.” Of course when you have a highly cultivated area, you can reclaim alkali lands, but not to raise wheat upon it.

Mr. WHITNEY. No; you can not irrigate to raise wheat.

Mr. BROOKS. Yet nine-tenths of our wheat in Colorado is raised under irrigation.

Mr. WHITNEY. It is generally considered that where you have to resort to irrigation wheat is one of the crops you ought not to grow; it is one of the last crops that you ought to grow.

Mr. BROOKS. It is a difficult crop, but a great deal of wheat is raised under irrigation in the Rocky Mountain region. We raise a great deal in our country.

Mr. WHITNEY. In Colorado?

Mr. BROOKS. Yes.

Mr. WHITNEY. I was speaking more particularly of conditions in California. I do not want to think of raising wheat under irrigation in California because there are so many more profitable crops that they can grow, and to reclaim fruit lands, even at the expense of underdrainage, which is not necessary in a great many cases. Fruit

lands you can well afford to underdrain, just as you can afford to drain Iowa soils upon which they raise corn.

We have found that underdrainage is not necessary in a great many places and that the land can be reclaimed from alkali at a very much less cost than we have been put to in the underdraining of those tracts where we have operated. But by using the underdrainage methods we have insured success, and now after our experience we know where underdrainage is necessary and where it can be done without, and I am asking this year for an additional \$5,000 for the alkali reclamation work in order that we may have two additional assistants and their field expenses so that we can take up other areas, so that they can travel and advise, and so that we can meet the demands that are coming from so many localities for assistance in this work.

I think the committee will not be perhaps particularly interested in the work of the laboratories, but it is very essential to us. It is not, however, of a showy or an apparently practical nature, but it does enter into all of our work, and the laboratories are very important.

One of the results of the work of the laboratories in the last two or three or four years has been that we have at last reached a point where we are beginning to understand the fertility of the soil, the manurial requirements, and what it is that limits the yield of crops.

About two years ago I appeared before the committee prepared to answer questions, because the Bureau had been very severely criticised in the country, and I understood that there were letters in the committee criticising me and criticising the Bureau, and I supposed that the matter would be brought up in the hearings. But it was not brought up and I let the matter pass over. Last year I was not before the committee and had no chance to say anything about it. This year I am pleased to tell the committee that the cause of criticism seems to have been entirely removed. It was due largely to a misapprehension, to misrepresentations of what we had said. We have now the most cordial relations between the experiment stations, indorsements from many of the experiment stations, letters and publications which they have since issued, indorsing publicly the work of the Bureau on the fertility of the soil.

We have the most cordial relations with Cornell University, and with the New Hampshire Agricultural College; with the Rhode Island Experiment station, which has just published a bulletin indorsing our work and giving the results of their investigations; with the Ohio Experiment station, which has used our methods and has published the results on it; with the Illinois station, whence the first criticism that has come to us emanated; with the Iowa station and with the North Carolina station upon all these questions. We are operating upon questions which they found it difficult to criticise adequately with any language two or three years ago. There is no question but that at last we have gotten hold of the fertility problem in the soil.

We have checked up our work during the past two or three years against the field records of the experiment stations. We have found in Ohio, where we sent a party last year for three months, that we got substantially the same results with our little wire-basket method that they had arrived at in twelve years. At the Rhode Island station our methods gave the same manurial requirements that they had obtained in ten or twelve years; and the method is now being used not only by

the experiment stations, but also by individuals cooperating through the experiment stations, with our assistance and advice merely. The criticisms have entirely dropped. We are on the most friendly terms with our former critics, and the educational institutions are looking to our work now as the proper line through which a proper advance will be made in the study of soils.

We have been able during this past year to follow up the soil-survey work and to foretell the manurial requirements of the soils that we encounter in our particular areas, and I think it is going to be a very important feature of the soil-survey reports in the future. I am asking for an increase of \$10,000 for this new line of soil management. Doctor Bonsteel will tell you how intimately it is related to the soil survey and how it is a natural consequence—a natural outgrowth—of the survey of the soils, to be able to tell how the soils should be treated.

I have covered now the main lines of the work that we have asked increases on—\$10,000 for soil management, \$5,000 for the alkali reclamation, \$5,000 for tobacco researches, and for \$10,000 for soil surveys.

Mr. HENRY. That makes up the \$30,000?

Mr. WHITNEY. Yes, sir.

Mr. HASKINS. Thirty-one thousand five hundred dollars?

Mr. WHITNEY. Yes; and there remains an additional clerk that I have asked for at \$1,800—a clerk who can keep the records of our field work, prepare them for the lithographer, and who can take charge of what we may call the office records.

Mr. HENRY. That would be in the nature of a promotion?

Mr. WHITNEY. It would mean also an additional position to fill at \$1,400.

Mr. LAMB. That is the only increase you ask for clerks?

Mr. WHITNEY. Yes; I have had that man with me for three or four years.

Mr. BOWIE. What is his present salary?

Mr. WHITNEY. One thousand four hundred dollars. He came to me from the Bureau of Statistics. Some three years ago he came to me at a reduction of salary in order that he might get into this line of work. He was then getting \$1,600 a year. He has been with me three years, has a thorough mastery of the work, and is perfectly competent to take charge of it. It is an important line of work, and I earnestly recommend that he be given \$1,800 a year.

Mr. BOWIE. What did he get previously in the Bureau of Statistics?

Mr. WHITNEY. One thousand six hundred dollars. He is now getting \$1,400 in our Bureau. That will give me another \$1,400 clerk, which I very much need.

Mr. BOWIE. That will be a promotion also to a \$1,400 clerk, and the clerk you actually get will be further down the line?

Mr. WHITNEY. Yes. In filling the positions of responsibility in the Bureau of Soils we have found it necessary to increase the pay or else lose our men. We have recently lost seventeen men from the Bureau, ranging in salary from \$3,000 down to \$1,000. They have gone out because of the work they have done in the Bureau of Soils, because of the name they have made, and while I am very glad to see them benefit themselves I am very sorry to see the Bureau lose so many of our good men at salaries far beyond what we could hope to offer them.

Mr. BOWIE. Is not that almost invariably the case with any man who is a success in some specialty? Private industries can afford to pay and do pay more than the Government does in any Department of the Government.

Mr. WHITNEY. Yes. I do not regret it or object to it at all; but I want to call the committee's attention to the fact that in the past month or six weeks we have lost three men, who have gone out at increases of from \$800 to \$1,000 more than we have been paying.

Mr. HENRY. Where have they gone? To some State experiment station?

Mr. WHITNEY. Mostly to commercial houses.

Mr. HENRY. That speaks well for the record you are making that commercial houses want your men.

Mr. ADAMS. I am frank to say that I had this impression about the work of the Bureau of Soils, that its general soil survey work or the value of it might be questioned. Of course, my mind, I think, is open to conviction upon that subject, as I hope it is on all others, but I realize and recognize fully, I think, the value of this work you are doing in experimenting upon soils for tobacco. I have not very much confidence, of course, in the value of a chemical analysis of soil by itself, but you do more than that, and properly, too, and it is a very valuable work, as I think, but it seems to me that the work upon masses of soils of the United States generally, as it has been done to a considerable extent in recent years, is very doubtful as a practical utility. For instance, you go on and go into a Congressional district, say, up in my State, and you incorporate it in what is called a general soil survey and a map. That work has been published and has covered a vast amount of territory—

Mr. WHITNEY. Where is that?

Mr. ADAMS (continuing). Throughout the United States generally.

Mr. WHITNEY. I thought you meant in your district particularly.

Mr. ADAMS. No; generally. But do you think that is of real practical value aside from the general interest which a map, a map such as you may call a wholesale map, would have? Of course, you do not get down to details and narrow limits. You can not do it, and of course on your maps you have a certain area colored as being of a certain kind of soil. Of course, the truth is that in that area there are a great many different kinds of soil entirely distinct from that which is supposed to be characteristic of all of them, and a detailed map of the different sections would show a marked difference in the soils from the general designations you make, so that the map would not be strictly accurate or correct. For example, as I stated last year to the committee, on a little farm I had of 72 acres I had some soil which was partly prairie soil, black soil, and then I had a stiff clay loam, and then I had a gravel soil and a sandy loam, all within the compass of some 72 acres. Now, it seems to me that so far as the work of the Bureau is concerned, while I recognize its importance generally, its resources might be diverted to more profitable ends than that business of making a general soil survey of the United States. I simply inquire what is your opinion, and why you entertain it.

Mr. WHITNEY. I am going to say that there is an enormous demand for the soil surveys. I would like you to hear Doctor Bonsteel, who has charge of the soil survey. He will answer the very questions you have propounded.

Mr. BROOKS. Just one moment. What is the nature of the demand you speak of? Is it curiosity, or is it an intelligent demand?

Mr. WHITNEY. Will the chairman permit Doctor Bonsteel to address the committee and show some of these things? I think he can answer those questions to your satisfaction.

Mr. HENRY. Certainly; let him proceed.

**STATEMENT OF MR. J. A. BONSTEEL, SCIENTIST IN CHARGE OF
SOIL SURVEY WORK, DEPARTMENT OF AGRICULTURE.**

Mr. BONSTEEL. Mr. Chairman and gentlemen of the committee, I would like to take up this discussion of the soil survey, the actual work itself, from the standpoint of the question that was asked, What is a soil survey? and then of the other question, What is the use of a soil survey?

The fundamental basis of our soil-survey work is the same basis that the farmer himself uses in judging of the soil. If you ask any farmer what character of soil he is farming, he will tell you, first, either a clay or sandy or gravelly soil, or a muck soil, using perfectly well-known terms, and those which are commonly well understood all over the United States, having about the same meaning everywhere. He will also speak of his soils as being underlaid by certain sorts of subsoil. There is gravel under it, 2 or 3 feet in depth, which gives it first-class natural drainage, or it is underlaid with rock. Such soil is not deep, so that the development of plant roots is limited. He will tell you also of the exposure of his soil, how it lies to the sun-light, to the air, and to the wind, and he will tell you of the surface of it, as to whether it is rough, or hilly, or stony, or whether it is level or smooth, as in a prairie country. We use in our work and in our reports exactly those determinations, and we use them in making a map of the soil.

We start in with an inch-and-a-half auger, and extend the stem to an inch in length, and make a boring down through the surface 6 inches, the surface of the soil, and examine it by the eye and by feeling as to whether it is a coarse sand, or a sandy loam, or possibly a pure loam, or maybe a stiff clay, taking a record of that examination. We then carry that boring with the auger down to a depth of 3 feet in the Eastern States, and on account of the alkali conditions in the Western States we bore down to 6 feet.

We take a record of those borings. In starting out for a day's work we will find perhaps four or five or half a dozen borings that seem to be exactly identical. They belong to the same kind of soil, and it can be assumed generally that that soil will give us the same results. Then we will go to an area of a different kind, say of coarse sand, contrasted with the clay that we have investigated before. Then by making a few borings across the contact between the two sets of borings we will be able to outline a boundary dividing the two localities having those different characteristics.

Mr. ADAMS. Permit me to interrupt you right there. You say you find the same kind of soil among these various soils—the same kind which will, under the same treatment, secure or give the same results. Are you sure of that?

Mr. BONSTEEL. Yes, barring one thing—the life history of the farm. Some soils have been so abused, you know.

Mr. ADAMS. Is it not true that when you get those samples and subject them to a very careful analysis—taking, for instance, a dozen samples exactly alike in their chemical analyses, and yet by experimentation, by putting plants upon them, you may find a dozen different distinct results?

Mr. BONSTEEL. Will you allow me to take that matter up in the proper order, as I have arranged it in my mind, with reference to this general subject?

Mr. ADAMS. Yes, certainly; go ahead.

Mr. HENRY. I would suggest that perhaps it would be better to let him go ahead now in his own way, and then at the conclusion of his statement let Mr. Adams cross-examine him.

Mr. ADAMS. I did not want to cross-examine you [addressing witness]. I simply wanted to call that point to your attention, so that you could refer to it.

Mr. BONSTEEL. Yes, sir; I understand. In making those field examinations, then, our work is to determine the character of the surface soil and also of the subsoil with regard to its texture, its characteristics, its component parts, the topography of the ground, the character of the surface soil, as to whether it is a loam or sand or clay, and the character of the subsoil in the same way. Our work is also to determine the method in which the grains or minute granules of which the soil is composed are held together. We know of some clays, for instance, which are plastic or stiff, like putty and cement, and others which are very well granulated, like the adobe soils of the West or Southwest, or like the big sheet soils of the great bottom lands of the South.

Then, also, we take into consideration the structural arrangement of the soil, and then we take in a further point, the amount and the character and the distribution of the organic matter in the soil—the partially decayed organic matter that is held in the composition of the soil. Some soil will be heavily loaded with organic matter as, for instance, the prairie land, while others, like the timber lands, will be almost ashy and gray or yellow in color and comparatively free from organic matter.

Then we have to take into consideration the facts as to whether the land lies in such a position that it has free and sufficiently natural drainage, or whether it lies so that artificial drainage is necessary. We have to take into consideration the fact whether the land lies as a flat, level prairie country, or whether it lies in the form of hills and valleys in the mountains; that is, the topography, the general lay of the land. And so, using and balancing these different factors together, we form our judgment of the characteristics of a particular soil which we have got to know.

Then, after we have started the examination of different areas, certain definite characteristics of each one of these types are developed, and we thenceforth recognize the soil that we have once treated in that way as you recognize a person on the street—not because the man whom you recognize has a long nose, or has short ears, or anything of that kind, but because he has certain general characteristics which you are familiar with and which you unconsciously bear in mind.

The man in the field does this work and makes these borings and this determination of the soil, and draws his maps and represents to the best of his ability, on a scale of 1 inch to the mile, all of these

characteristics he has found—as well as he can on a map of that scale. He can not put them all on, but as many as he can put on the map he shows, their type and their distribution and their area.

That takes us up now to the point which Mr. Adams raised, that a certain farm might have been handled before by an adept farmer or expert, and on an adjoining farm, across the next fence, you might say, would be land which had been handled by a man who was a moderate farmer or a very poor farmer. It is not the fault of the soil that one man on one side of the fence has got 5 bushels to the acre and the other man on the other side of the fence has got as much as 25 bushels to the acre. Their soil is capable, perhaps, of making the same yield, but it is necessary to have the best possible management to produce the best possible crops, and where there is a scanty yield in such a case it is the fault of the man who is running the machine, and in this case the machine is the soil. It is, in other words, the fault of the farmer himself that he is not getting a better crop.

In order to solve the difficulties that are found in a field, say on identically the same soil or soil of the same type, we have taken up what we call the "wire-basket method" for the determination of the manurial requirements.

Mr. ADAMS. Will you take that up now?

Mr. BONSTEEL. Yes; in that method we collect samples of soil, usually from farms which are not giving satisfactory results, and we have them send in samples of 100 pounds of soil to the soil survey. Then that material is taken up and macerated into good working condition, such as the farmer would call tilth, for working. We then use a little wire pot arrangement, and, taking a small sample of that soil, we put it into the pot. We take a small-mesh wire gauze and make a little pot about 3 inches wide and 3 inches across the center, and then we turn that bottom side up and dip it into paraffin. Then the pot is turned right side up, and in five of these little pots, arranged in the way I have described, the untreated soil is placed, and that is dipped down into the paraffin again and the soil sealed up in there, in the pots. Later on we take wheat germs and select six of about equal strength and growth, and plant them in each pot, and then seal it up over the top. The reason for this treatment is that we wish to keep within the basket everything that is put in there, and let nothing get out—that is, we want to make that pot or basket a little world all by itself, containing nothing but that soil and those germs and whatever kind of fertilizer we use.

We want to know what the manurial requirements of the soil are. We have five baskets in the experiment under treatment. We use 10 tons of stable manure to the acre or we use stable manure proportionately at that rate in that trial, or we use 200 pounds of muriate of potash or 200 pounds of sulphate of potash or 200 pounds of phosphoric acid. We use different combinations of these materials, and then we use complete fertilizers in different amounts. We use them with and without lime and with and without green crops.

We observe the growth of those germs and plants for three weeks and note all the characteristics and the amount of moisture excreted, and so on, and at the end of that time we get the crop just as the farmer would, and we weigh up the amount of grain of the plant raised. That does not show whether you need a certain number of pounds of ferti-

lizer to the acre, or anything of that kind, but it is the method of showing whether that particular soil needs stable manure or a fertilizer or a particular formula or a green crop ploughed under or lime or nitrogen to meet the broad fertilizing necessities of the soil.

We recognize in our soil survey work—coming back to that other point that was made—that the physical properties of the soil as first described control the character of the remedy applied, whether you shall raise wheat or corn or grapes or tobacco or cotton. We recognize also that, perhaps, other factors that are unknown or little known, and which are being studied by the Bureau, control as to the kind of fertilizer we should use to get the largest amount of a crop, so that we have to make back studies in the soil—the soil survey studying the crop adaptation direct and the soil management studying the manurial requirements of the soil. That is the reason why we have two divisions in this work. That is the reason why the soil survey does not determine at any time, without the help of the soil management, what fertilizers should be used. But we know that, given two farms at a considerable distance apart but in the same climatic region, with the same soils as we map them in our maps, the same crops are adapted to those soils; and if we find Mr. A, in one portion of a county, is having splendid success in raising a given crop—say, of corn, for example—we can tell Mr. B and Mr. C, in the near vicinity, that their land, too, is good for the production of corn.

MR. ADAMS. Is not that all practically set out in Johnson's Agricultural Chemistry?

MR. BONSTEEL. Yes. Mr. Whitney will tell you that those general principles are primarily found in Johnson's Agricultural Chemistry. But we recognize that beyond the soil we have climatic and other conditions to deal with. So far as the soil factor is concerned in producing crops, we can study out the adaptation, and that brings up the other point, namely, why this should be a Federal organization. For instance, we study the truck-raising question in southwestern New Jersey—

MR. ADAMS. The point I made was with reference to the advisability of a general wholesale soil survey of the United States.

MR. BONSTEEL. Yes. We have made a soil survey, say, in southwestern New Jersey, around Salem, in which we have found certain individual soils, types, as we call them, and we have made a soil survey down in eastern Maryland, and in Delaware, right adjacent, where we have found the same type of soil. Then we have made a survey in southern Maryland—those counties down at tidewater—where we have found the same conditions as those in New Jersey. But one of those types, under the careful farming of those New Jersey Quakers and other careful people around there, is worth, say, in its crops, about \$150 per acre, producing from 45 to 60 bushels of corn and from 30 to 32 bushels of wheat. Those are high crops, the best which the farmers there can produce, and they produce also oats and hay very satisfactorily.

On the eastern shore of Maryland we find a little less satisfactory condition. There the farmers confine themselves to about three crops—corn, wheat, and timothy hay. In southern Maryland we find a very unsatisfactory condition on the same soil type. The climate is not very different; the transportation facilities are somewhat different,

but the character of the people is absolutely different. The character of the soil, however, is essentially the same. The reason, then, for making broad studies of the soils of the United States is in order to be able to tell the men in southern Maryland that they can not to advantage raise tobacco, corn, and wheat. They must vary their crops and bring in a rotation and use different methods of culture. And in that connection we can cite to them the cases of the others which I have just mentioned and the different methods used and the different results obtained in the same class of soil in New Jersey and on the eastern shore, Maryland, and in Delaware. In other words, the soil survey of that Salem County, N. J., is not only of value to Salem County itself, but it is of the utmost value to Kent County, Md., and St. Marys and Charles and Prince George and Queen Anne counties, Md., and to half a dozen Virginia counties also, where less intensive systems of cultivation are used and less satisfactory results are obtained.

Mr. COCKS. Do you not get something similar to that on Long Island?

Mr. BONSTEEL. We do. We have, for instance, a sandy soil there, one of the best trucking soils in the United States, and the people of Long Island are using that for market-garden purposes. They do not raise melons there, I presume, because the melons would not "stay put," possibly on account of the large amount of picnicking going on there—

Mr. COCKS. We would have to spray them anyway. [Laughter.]

Mr. BONSTEEL. They are raising market-garden crops. The market gardener raises a little patch about the size of this table, whereas the trucker raises a large acreage, 15 or 20 acres of sweet potatoes, for example. The truck furnishes the great demands of the cities, and the patch furnishes the demands of the commission men.

Mr. COCKS. We want the survey to come there.

Mr. BONSTEEL. Yes, but by taking the same knowledge that we get from a farm conducted in those two areas and applying it farther south or farther north—I don't care which—you can solve the problem.

We are gathering not what we think or what we find in the laboratory, but actual results secured by the farmers themselves in the field. That is, they are conducting the biggest experimentation ever conducted in the United States, and they are paying most of the money for it, because a large majority of them do not know how to get the best results, and their experience is costly to them. We are trying to gather together a vast amount of that experience and put it in our reports. We try to find the adaptations of the soil, the manurial requirements from the actual experiments of farmers, and then take our accumulated experience into all areas and bring all the farmers' experience together and digest it, and get the results which we can put out as being as near the best as anybody human can get it.

Now, you asked [addressing Mr. Brooks] as to whether people are inquiring about these soil surveys from curiosity or because they really want to know about them from practical motives. If it will not tire you, I would like to give you one or two characteristic requests that we have here.

Mr. COCKS. Allow me to ask you, right there, before going into that, whether there are any localities more highly cultivated than Long Island in the matter of truck farming?

Mr. BONSTEEL. I have never seen a more highly cultivated area than the region in and around Kings County, N. Y., where each little plot is laid out about the size of a tablecloth. [Laughter.]

Mr. COCKS. I sometimes think we use too much fertilizer and too much manure. We do not rest our ground enough.

Mr. BONSTEEL. I believe that is a fact, and I think they are using perhaps nearly double the quantity of fertilizer and stable manure that is necessary. But in such conditions I do not see how they can do any better. They are not cultivating soil there, really. They are taking so much dirt and making an artificial soil for artificial purposes. It is the nearest approach that I know of out-of-doors to a greenhouse condition.

Mr. COCKS. It would be a valuable thing if we could prove to those people that by plowing clover under we could rejuvenate that soil. But that is the trouble we have.

Mr. BONSTEEL. They need a cheaper source of organic matter than the street sweepings and stable manure give them.

Mr. COCKS. They pay \$1.70 per ton for it, too.

Mr. BONSTEEL. If they can raise a green crop and between their actual truck crops restore their soil in that way, they would have a better economic system.

Mr. WHITNEY. That is not the most serious problem we have on Long Island. I would like to interrupt you just to tell Mr. Cocks what it is. The serious problem is the wilderness that exists within 50 or 30 miles of New York, where land can be bought for \$1 or \$1.25 per acre.

Mr. COCKS. New York speculators are buying that up and selling it to men in Pennsylvania and Ohio and other places. We have two big State institutions there that contain over 2,000 insane now. That is one thing we do with them.

Mr. BONSTEEL. One of the most valuable lessons I got in Long Island was from the Central Insane Asylum. We have a good system of sewage and a good water supply; but that central portion of Long Island is an eastern desert. There they use their excess garbage material and their excess water to produce crops, and that sand, when you take it up, will not stay in your fingers, and yet they are producing celery on that land. It is the same question there as in other places where you can get water enough to irrigate on such soil.

Mr. LAMB. Is there any timber in that wilderness that you mention there?

Mr. BONSTEEL. Scrub oak about 4 feet high, and some pitch pine.

Mr. DAVIS. Then commend me to Arizona!

Mr. BONSTEEL. I scared up some deer there within four or five miles of New York. Now I want to give you a letter and a set of resolutions for the record, if you wish, or you can leave them out if you do not want them. Here is a letter from a gentleman from California, Mr. W. A. Beard, written from Sacramento on January 22; and I may say here, by way of explanation, that Mr. Beard was here urging us to take up work in the Sacramento Valley. They have a condition there where a considerable amount of this dry farm wheat land is being broken up into fruit ranches, and they wish to impound the water of the Sacramento River to the northward and use it for irrigation, and use it in fruit raising, and at the same time they hope to relieve the

field condition in the Colusa region. That also will take away the danger of destructive inundation over the diked land, over the country in the neighborhood of Stockton. Nine counties have banded together there and laid a tax of 1 mill on \$100, just to get a hydrographic soil survey in there and to get done the general work of taking up the requirements of that country. It is one of the unique things in American agriculture, not that nine counties should do that themselves, but that they should do it each in order that the other counties should have the advantage of it, too.

Here is the letter of Mr. Beard [reading]:

[Sacramento Valley Development Association. Organized January, 1900. Composed of the counties, municipalities, and organized commercial bodies of California's great interior valley.]

SACRAMENTO, CAL., January 22, 1906.

HON. JAMES WILSON,
Secretary of Agriculture, Washington, D. C.

DEAR SIR: Herewith I inclose resolution adopted by the Sacramento Valley Development Association at a regular meeting held in this city on Monday, January 15, 1906.

I am requested to transmit to you this resolution, and in so doing I desire to say for the executive committee and for myself that the soil survey requested therein is one of the great needs of the present time, and we most earnestly trust you may find means to provide it.

The Sacramento Valley is very much in need of irrigation development; the dry lands of this valley, and the greater portion of the area of the valley is dry land, are suitable for early maturing crops alone, and have been planted to small grains continuously for fifty years, with resulting decrease of yield. Grain growing to-day on these lands is unprofitable, and land owners must find relief through new methods of agriculture.

Fortunately, the water supply is ample for the irrigation of the entire valley, and there are many evidences that irrigation development both through the National Government and through private enterprise is not far distant. We desire soil surveys as a step preliminary to the irrigation of the valley, and we believe the conditions here will warrant a special effort by the Department of Agriculture of the United States to provide it.

Sacramento Valley lands, where sufficient moisture is provided to mature crops, are extremely fertile. The climate is typical of California. We have no winter here, the growing season is practically continuous, and under these favorable climatic conditions the maximum of production is secured from irrigated soils.

We trust you will see fit to direct that a soil survey be undertaken, and I beg to state on behalf of our executive committee that we believe such survey will constitute a most valuable contribution to the agricultural progress of this State.

Very respectfully, yours,

W. A. BEARD, *Secretary.*

What they desire there is that we shall make a soil survey in the Sacramento Valley which will tell them whether they have the same kind of soil that has been farmed with fruit for years in the San Joaquin Valley, and as to whether they will result in the same conditions as to alkali, or else that we shall go there and instruct them in an entirely new style of agriculture in California.

MR. BROOKS. Are you not covering the same ground that the irrigation and drainage investigation people are covering with regard to the application of water to the soil?

MR. BONSTEEL. No, sir; I have here the correspondence between the Department of the Interior and the Bureau of Soils of the Agricultural Department—a copy of it.

MR. BROOKS. I do not mean the Department of the Interior, but the Department of Agriculture—the Bureau of Drainage Investigation in your own Department.

Mr. BONSTEEL. I do not think we are. Professor Whitney is more conversant with the work than I am.

Mr. WHITNEY. We have nothing to do with the study of the methods of irrigation. We are only working on the soils, and we examine their land for them when they take up land to study irrigation.

Mr. BONSTEEL. That is Mr. Mead's division?

Mr. WHITNEY. Yes.

Mr. BONSTEEL. I did not understand the question when it was asked. We are determining the amount of alkali in order to see whether 50 or 30 or 10 per cent of that land would become alkali when irrigated, and whether it be big enough to pay the expense.

Now we have applications for surveys from New York State, from Schoharie, N. Y., for example, requesting that we should take up the work in that region, to find out whether they have the same kind of soil in Schoharie as they have in Onondaga, where they are cultivating alfalfa and getting 5 tons to the acre.

Mr. WADSWORTH (the chairman). Where are they cutting 5 tons to the acre?

Mr. BONSTEEL. In Onondaga, in New York State.

Mr. FIELD. Without irrigation?

Mr. BONSTEEL. Yes. I understood they are doing that on the farm of Mr. F. G. Dawley, of Fayetteville, N. Y.

Mr. WADSWORTH. Is that the first year it was cut?

Mr. BONSTEEL. No; that was the seventeenth or eighteenth year.

Mr. COCKS. That was green?

Mr. BONSTEEL. No; it was cured alfalfa hay. It was dry.

Mr. BROOKS. That means all the cuttings in a year?

Mr. BONSTEEL. Yes; three or four cuttings.

Mr. WHITNEY. Alfalfa has been successfully grown there for many years.

Mr. BONSTEEL. Yes; in the Mohawk Valley the Mohawk Germans who came in there before General Herkimer's time, in about the year 1754, have been raising alfalfa very successfully ever since that time. It has been raised from Stone Arabia and Palatine to Syracuse, and it attracted no attention because it was called Luzerne and was raised by those people who were called foreigners.

Mr. WADSWORTH. I did not know there was such a yield in New York State.

Mr. BONSTEEL. It would be about a ton to the acre to a cutting.

Mr. WADSWORTH. You can not get three cuttings in our State. The last cutting must be somewhat risky, then.

Mr. ADAMS. You ought not to cut the last cutting.

Mr. BONSTEEL. No; it should be allowed to stand. We have 3½ feet of white mulch up there.

Mr. ADAMS. We get two good cuttings in Wisconsin.

Mr. WADSWORTH. I think it would be hard to get three cuttings in Wisconsin.

Mr. BONSTEEL. One of the strongest demands we have at present upon the time and service of the Soil Survey is to outline the soils where these new varieties of tobacco can be raised. The people of Texas would like to know through what portions of the State they have the Orangeburg soils—those red sandy and sandy clay soils. They want to know where they can be had. They have heard of the production of a new crop on those soils. They have heard that within

a few years. The cotton boll weevil will have put them into such a condition before long that they will have to diversify their crops and get other crops besides cotton. One of the demands on us is to outline throughout the South the entire region where those soils occur, so that if the farmers in one particular locality are not interested in taking up the tobacco production the farmers in another locality, where they are keen to grow it, can take that up.

Mr. BROOKS. Who have requested service out in my country?

Mr. BONSTEEL. The people in Mesa County, Colo.—I don't know. Do you know, Professor Whitney, from whom these requests came in the country around Grand Junction?

Mr. WHITNEY. From the sugar people.

Mr. BONSTEEL. Yes; and we have requests from people of the San Luis area as to the control of alkali and in adjoining areas. That is the reason for the red spots there [indicating on map].

Then we have a call for a survey in the Uinta Reservation, in Utah, and we have demands for a resurvey in the sugar-beet region. We have made surveys in southern Michigan, and have found out the characteristics of soils there—all the sugar-beet soils we know.

The sugar-beet soils must be able to maintain a high moisture content throughout the season—not high at the beginning and low at the end, but high and uniform throughout the season. In order to do that under those climatic conditions up there the soil must be one of those friable loams with a large amount of organic matter in it. It must be easy to cultivate, otherwise the beet will be gnarled and knotty and of small size, and the yield per acre will be low.

We have found out a certain series of soil there, called the Clyde series, that will meet these requirements. We have found out similar soils in adjoining States that meet the same requirements, and the calls we have received from Minnesota and Wisconsin are largely to meet similar conditions. I believe Doctor Wiley has already told you of belts of similar climatic conditions stretching across the United States. Our study of the Michigan area shows us that those soils give those conditions. The beet must not only grow uniformly, but at the end of the season the proper sunlight for its proper development must be supplied in order that the saccharine quality may be imparted.

Mr. WADSWORTH. Do you expect to control that sunlight?

Mr. HENRY. Doctor Wiley said the saccharine matter of the beet was dependent upon the climate rather than from the soil—the temperature and the climate.

Mr. BONSTEEL. Yes. If a man only gets 5 tons of these sugar beets in a sugar country it won't pay. He must grow at least 12 tons to make it a good proposition for the farmer.

Mr. HENRY. I think he said so.

Mr. BONSTEEL. We have found in going through the factories in New York State and Michigan that the sugar men know from what farms they get the best beets. They do not know why. We study the farm end of it, and we also study the factory end of it by differentiating the contents of the beets; and we find that those Clyde soils in southern Michigan are the ones that give the best beets and the beets most rich in sugar.

Mr. COCKS. Is that the same soil as that at Geneva?

Mr. BONSTEEL. No; it is somewhat similar to that. It is more like the Miami black prairie soil. They meet this requirement, but not

quite so well as the Clyde series. Those are lake deposits, where the lakes have dried up and left deposits of black dirt, which give a friable soil for the sugar beets and one in which the water is maintained in the growing season; and, as Doctor Wylie said, in September they get the necessary sunlight to develop the sugar. In the Janesville, Wis., area we have sugar-beet soils, and in—

Mr. ADAMS. And over in Columbia and west of that?

Mr. BONSTEEL. Yes; this is the curious thing that has come to our attention in studying sugar-beet soils: The sugar-beet soils of the humid region of the Atlantic coast have no resemblance to the sugar-beet soils of the interior and to those of the California coast. Wherever we find along the coast line a limited amount of water for irrigation and a desire to raise beets we find that the heavy clay loams like the adobes are the ones they choose. They put on a large amount of mechanical labor to make a good water-holding soil for that material, and then they put on a small amount of water.

Mr. HENRY. The water is not there?

Mr. BONSTEEL. No; and then where the water supply is irregular they want to get it rapidly when they need it and get rid of it rapidly when they do not want it; and they artificially control the water supply.

Mr. ADAMS. In your investigations of that subject in your Bureau have you found any of these drained marsh lands extremely rich in organic matter; lands which, according to chemical analysis, might be presumed to be very productive, yet on trial are found not productive of anything?

Mr. BONSTEEL. I know of some cases in the Janesville area, which I met in the summer of 1902. North of Janesville there is a marsh which, though not drained entirely, is drained on the margins, and there they raise considerable crops.

Mr. ADAMS. A large area of that land adjoins my home country.

Mr. BONSTEEL. They resort to the use of a considerable amount of three things—either a considerable amount of stable manure, or of muriate of potash, or sulphate of potash.

Mr. ADAMS. Professor Henry has been experimenting for years with large steel tanks—experimenting with the soil, and testing fertilizers and manures.

Mr. BONSTEEL. We have the same conditions in northern Indiana and Illinois. They are called moor or boggy soils—a peaty kind of soil.

Mr. WADSWORTH. There is not much depth to them?

Mr. BONSTEEL. There is 3 or 4 feet of peat or muck.

Mr. WADSWORTH. We have some of them in the upper part of the Genesee Valley. What is the other kind of soil there?

Mr. BONSTEEL. They have in Wisconsin, also, a white sand and gravel. In the New York State soils they have the blue clay more frequently.

Mr. WADSWORTH. In Wisconsin the moisture would drain off?

Mr. BONSTEEL. Yes.

Mr. FIELD. There is one question I would like to ask you with reference to this soil adapted to the growth of tobacco: Does it happen that by an inspection of a limited quantity of top soil you can determine what the whole subsoil is?

Mr. BONSTEEL. No, sir; I should have to have a good-sized sample of both the surface soil and the subsoil. It is the surface soil in relation to the underlying material that produces the crops.

Mr. FIELD. From a mere ocular inspection could you analyze it?

Mr. BONSTEEL. You could send me soils of pretty near the same physical texture and appearance from up here in New Jersey, or possibly out in Nevada, and I could not distinguish accurately without also knowing the location. But if you should tell me they were from Lavaca County, then I should know. In that case if such a sample were submitted to me without a statement of where it was from, I would turn it over to the man I am associated with. The value of this service consists not alone in the value of the maps and the value of the reports, but in the gathering and assembling of this information. This information that I have told you of to-day does not comprise the things that I am personally familiar with. The principal value of the thing is the information gathered by these men working over an area of 100,000 square miles in the United States. It is information that is being tested in one region and another, and as we map out more areas we are more and more certain as to the definite adaptation of the crops to the soil. If we have only a few examples we are led to believe such and such is so. If we have more examples, a thousand examples, say, we know it is so, and so positively.

We are anxious to know not only what are the best corn soils, but what it is that makes them the best corn soils. There the laboratory comes in and helps us out. Mr. McNess wants to know why we can not raise Turkish tobacco in the United States. I believe we can, but hitherto nobody has tried it. All the work of the Bureau of Soils interlaces and locks together. If we are making a survey in southern Georgia, and if we report certain soil types there, and I want to inquire of a tobacco man if he has the soil that they have in Gadsen County, Fla., where they are raising good tobacco, they will tell me. The soil survey and the soil management, the two branches of our work, progress together.

Mr. ADAMS. Have you extended your soil work in tobacco to the Philippines and Porto Rico?

Mr. BONSTEEL. One of our men was loaned to the Philippine government for eighteen months, I believe.

Mr. ADAMS. When did he go?

Mr. BONSTEEL. He went in May, 1902, I believe——

Mr. WHITNEY. Yes, in May, 1902——

Mr. BONSTEEL. And remained there until the middle of July, 1903.

Mr. ADAMS. I would like to ask Doctor Whitney if he does not think it entirely possible that they will find in the Philippines, that with the proper treatment of these soils and using the right varieties of tobacco, they may develop a tobacco industry there which will furnish far better varieties and kinds and qualities of tobacco than they now raise?

Mr. WHITNEY. Personally I know there is a future for the Philippine tobacco, but so far as I understand the conditions there, the area is limited. Therefore, I think they will raise a fine quality of tobacco when they get better methods than they have now. But the supply will be limited by the small amount of land adapted to it, because tobacco is grown only in a small district in the Philippines, as it is in our own country.

Mr. ADAMS. Do you feel quite sure that that district which is now used in the cultivation of tobacco is the only area that it could be used upon?

Mr. WHITNEY. Of course I could not speak, without more intimate knowledge than I have, as to the conditions there, but so far as experience goes, the cultivation of tobacco there is confined to a very small area.

Mr. HENRY. Has your man been up on the Bulacan Valley, on the island of Luzon, in the province of Isabela?

Mr. WHITNEY. I think he was. He was transferred to the Philippine Commission, and we had no control over him while he was there, so that I have no knowledge myself as to what he found.

Mr. COCKS. You were speaking a while ago of alfalfa. What are the chances on Long Island for alfalfa?

Mr. BONSTEEL. There are some chances for it on the southeast of Long Island, where the depth of water is not more than six feet. [Laughter.] If they could once get alfalfa started by a careful irrigation it would be as good a region along there in central Long Island as the western part of the island. That central region is quite dry for crops.

Mr. COCKS. In the last half year I have got a pretty good stand of alfalfa.

Mr. BONSTEEL. There are several very good alfalfa farms on Long Island, but I could not say that it was pretty well established.

Mr. LAMB. This may be a little out of your line, but how do they succeed in the Eastern States, where the rainfall is greater, in growing alfalfa?

Mr. BONSTEEL. That is one of the difficulties. I know in New York State the farmers are arranging to put the first crop under shelter, they having such wet weather, and later they will mow it.

Mr. WHITNEY. Before Mr. Bonsteel concludes I would like him to give an idea of the interests that use the soil survey reports. It has astonished me to find how many kinds of different organizations, different kinds of business interests, use the soil reports.

Mr. BONSTEEL. I think I should mention first the people who are actually engaged in the same kind of work—that is, the agricultural experiment stations and agricultural colleges that secure these reports. They are beginning to annoy me at the present time writing for samples of soils which will illustrate these reports. They wish to use the reports for text-books, and the soil samples for illustrative material in their class work.

We have requests on hand at the present time from the Iowa State University, from the Iowa Agricultural College, from the Ohio State University, from Yale College, from the University of New Hampshire, from Director Dugger, of Alabama, and from a variety of other educators and agricultural or commercial-geography educators who desire the reports, and the samples illustrating their reports, in order to show their students the great variety of soils which actually occur in the United States, and in order to show them the soils characteristically adapted to certain different crops. That is, what is a tobacco soil? They wish to show the entire range of tobacco soil, from the kind adapted to the heavy export tobacco to the finest, flimsiest cigar wrapper. A soil varies as much as the tobacco. They wish to show what are the

characteristic wheat soils, because wheat soil in Texas and wheat soil in Minnesota are entirely different things. They wish to show characteristic fruit soils; show the soils of the citrus region, the characteristic pineapple soil of Florida, the characteristic alfalfa soil of New York, possibly. Then they go to other persons and secure samples of the crops. They get photographs of the methods of producing the crops. They are training their farmers all the time in the methods of handling the crops, and they are giving these young men the most thorough possible knowledge of the agricultural resources of the United States. That is to me one of the most important uses made of these soil reports; that is, it extends our work away out into the other generations, and to large numbers of people.

Then, another class of people who use our reports are the people who are dealing with real estate, buying or selling. A very large number of requests come to us daily for soil surveys of, for instance, Wicomico County, Md., from somebody in northern Illinois, somebody out there who has been farming for a number of years, and who now wants to retire, who has accumulated enough to live comfortably, and he wants to buy a fruit farm in the East, where he can put in part of the proceeds from his farm in the West, live down there in Maryland, and amuse himself with the fruit, because once a farmer always a farmer. Those people want them because they do not want to be at the mercy of some scrupulous or unscrupulous real estate man; they want to know about the characteristics of the soils, where these other soils occur. We get appeals for help from those people, and some of them are pathetic appeals for help.

Then we also get them from real estate men themselves. There are dozens of real estate men—hundreds of real estate men—in the United States who wish to give their customers the best possible service, and they tell me, and I have had conversations with them, that in selling a farm customer after customer will say, "Where on this map is this farm located? I want to know." And they will not buy it until they find the location on the map. This is the case particularly on the high-priced trucking farms in the East and the high-priced fruit farms of the West. Then the question comes, "Is there alkali here, or is the soil so located that alkali will rise in time?" And the Eastern man has not the ghost of a show to know whether there is alkali or not, and there is where the soil report is useful. Then the real estate men, both seller and purchaser, use the map. The big investment companies use the soil-survey reports for a great variety of reasons. They invest their money, as you know, on mortgages and securities of that kind, which are agricultural securities, and they send their agents to form an estimate of the condition of the property—whether it is in good shape or not. They want to know also the general agricultural prosperity of the community—as to whether real estate values are liable within the next few years to rise or fall. They get this from the Government reports. They can not believe local parties in all those things, because they may be, consciously or unconsciously, prejudiced in their opinions.

Even one of the life insurance companies has wanted to secure our reports regularly, because they said that in certain districts they found different diseases which were associated with topographical and soil conditions, and that they had used in one of the States soil maps which we had prepared to generalize on the risks that they could take in

writing life policies. I do not see the connection myself; possibly it may be a swampy region, and they may have a question of malarial fevers, or something of that sort; they did not specify the areas.

Then the transportation companies are particularly desirous in the development of new land to have soil surveys made, a perfectly straight statement without bias as to what the land is good for or what it is not good for. I find, to my surprise, that there are considerable areas of unoccupied land, and vaster areas of land only partially occupied in this country, that is held in title, allowed to lie, and somebody pays taxes on it. A large amount of that is valuable fruit land, valuable tobacco land, valuable land for some new kind of crop that the people themselves do not understand, don't know how to produce, haven't heard of, possibly. Our soil surveys call attention to the fact that on a certain peculiar characteristic kind of soil a certain crop can be grown in a general region. Immediately, then, the question comes in—as it has in the Ozark region of Arkansas and Missouri—then the question being as to where we find the soil on which the Ben Davis apple can be raised, and every one of the transportation companies that touches that region wants soil surveys in order to direct the people who are going there, so that they may intelligently take up their lands. That is another one.

All of the Atlantic coast transportation companies, whether water or rail, are anxious to have surveys made there in order to see whether the characteristic trucking soils, the ones on which the early vegetables can be raised, occur within reach of their transportation. They want to develop the country.

Mr. BOWIE. There is a great deal of that trucking going on on the Atlantic seaboard?

Mr. BONSTEEL. Yes.

Mr. WHITNEY. There is a great deal going on on the Gulf coast, too?

Mr. BONSTEEL. Yes; we found that out in the southern Mississippi Valley. There is a great deal of land there that was once covered with timber, and now there is nothing but stumps left, and that land makes very valuable truck farms. They will supply the central portion of the United States, not competing with the northeastern portion of the country, which will supply the big eastern cities.

The grangers use the reports in connection with their grange discussions. The variety of individuals asking for the soil-survey reports is very great. The homeseeker looks for a soil-survey report—and I would not have you gentlemen think that the homeseeker is going in any one direction, either north, south, east, or west, at the present time, because the inquiries are coming to us from all parts of the country, asking for soil surveys in all parts of the country. We have as big a demand for the soil surveys of the Norfolk, Va., area from central States as from anywhere else. They wish to know what kind of soil is being used for trucking purposes there, where trucking has been so wonderfully successful, and they want to try it on some of the soils in the central region. We have a large number of requests for the soil surveys which have been published of Texas—what is known as the black waxy lands. It is known that alfalfa will grow there to good advantage, and people are anxious to get in. There is a big demand for all these tobacco-soil surveys. In New York the largest demand is for the soil surveys of the fruit districts—Wayne County survey. That was followed up by an apple-orchard survey made by

Professor Gray, of the Cornell Experiment Station. They have made a careful survey of that county and a partial survey of Orleans County. They want the soil surveys to go with them. Professor Gray tells me he wants the Niagara survey, so when he gets out his report on grapes and apples and peaches there, we can find out every soil fact that affects them.

That is the character of the demand we have for soil-survey reports and for the work itself; it is either the new crop, or new home, or investment, or the three things together, it may be, that bring about the demand for these reports.

Mr. WADSWORTH. Why do they need a soil survey where the apple crop is a great success already?

Mr. BONSTEEL. They took Walworth Township, for instance, and they made a survey to find out whether the factors of success were soil or climate, or method of cultivation, or drainage, or methods of fighting insect pests, or what.

Mr. WADSWORTH. Niagara County and Orleans County are the greatest apple counties in the State, and they have made a great success of it.

Mr. BONSTEEL. But they are not all making an equal success of it, even in that region.

Mr. WADSWORTH. That is a difference of men.

Mr. BONSTEEL. There are also differences in soils. I know of a case brought to my attention of soils from Orleans County, which were sent to me for identification, and one of the men said: "We apparently have the same class of soil that you described in one county, but we are not getting the same results." He gave me samples of the soils, and he also gave me photographs of the conditions as they existed. Out of a field of 25 acres it appeared that 17 acres were undrained; that is all that was the matter. You could see in the photographs the tufts of swamp grass, and the apples were dying. When you saw the rest of the land, a little farther back, you saw that the trees were in good condition.

Mr. WADSWORTH. Does it take the United States Government to tell those fellows that there was a wet soil there?

Mr. BONSTEEL. No; but it took the experiment station to tell them what was the matter.

The CHAIRMAN. That sort of a fellow did not deserve to succeed. He is the kind of a fellow who probably would not succeed in any business; who, if he went in the dry goods business, would fail in six months.

Mr. BONSTEEL. There are a large number of superstitions as to soils, an immense number of superstitions, almost as many as there are about planting in the waning or waxing moon, and anything they can not explain in any other way they attribute to the soil or to the climate, and it is necessary first to find out whether it is soil or climate or drainage, or, as you say, whether the man ought to be in the dry goods or some other business besides farming.

Gentlemen, I think that I have covered the work of soil surveys, unless there are some additional questions which the committee may like to ask me. If so, I would like to answer them now, face to face.

Mr. COCKS. I understand you to say that the solution for our central Long Island desert is irrigation?

Mr. BONSTEEL. In my opinion; because I have seen it tried successfully.

Mr. COCKS. But it needs an awful lot of fertilizer besides the water.

Mr. BONSTEEL. Yes; but you could have all the fertilizer in the world and without the water you could not get the results.

Mr. COCKS. You do not estimate that it would be possible to pump that water for the irrigation of the land?

Mr. BONSTEEL. I do. A centrifugal pump is used for supplying water for the big sugar-beet ranches in the Salinas Valley in California with good results and at moderate cost.

Mr. COCKS. And what is the depth of the water there?

Mr. BONSTEEL. At a depth of from 20 to 30 feet. The actual boring is something like 150 feet, but the water rises—it is semiartesian—to within about 20 feet of the surface.

Mr. COCKS. Such conditions do not exist on Long Island.

Mr. BONSTEEL. Yes; it is not more than 30 feet deep there. It is from 6 to 30 feet.

Mr. COCKS. But the 6-foot part of the land is taken up with residences.

Mr. BONSTEEL. Yes; but there is a considerable portion where you can get water at a depth of about 30 feet.

The only question is whether it would be an economical procedure to get that water and raise the crop. It is not a question of what can or can not be done from a scientific or engineering standpoint; there is no question but what it can be done.

Mr. COCKS. That land will have to come in competition with land a little farther west that does not need irrigation?

Mr. BONSTEEL. Yes; I understand that.

Mr. COCKS. And a greater freight rate, and all that?

Mr. WHITNEY. If those are all the questions that are to be asked in regard to soil to-day, I would like to state to the committee that the tobacco expert, Mr. McNess, is here, and if you would like to ask him any questions in regard to the details of our work he will be glad to answer them.

Mr. BOWIE. Before that I would like to state to the committee that Mr. Brantley wants to make a brief statement.

STATEMENT OF HON. WILLIAM G. BRANTLEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF GEORGIA.

Mr. BRANTLEY. Mr. Chairman, I have come on another begging expedition. This committee has been kind from year to year in furnishing money for an experiment station at Waycross, Ga., and our understanding last year was that Congress would not be called upon to make any further appropriations. There is a plant there that has cost the Government considerable money. It is advertised to be sold on the 8th of February. The Department of Agriculture is quite willing to donate that station if Congress will sanction the donation of the Government station. Here is an amendment that was written in the Department of Agriculture as expressing their views about it; I did not write it myself:

That the Secretary of Agriculture is authorized to deliver to the agricultural experiment station of Georgia the building and machinery belonging to the Department of Agriculture at Waycross, Ga., which has been used in the study of production of

table sirup, on the condition that the agricultural experiment station of Georgia establish and maintain a substation at Waycross, to be operated in the interest of the sirup industry and other agricultural industries in that part of the State.

The CHAIRMAN. What is the value of the property?

Mr. BRANTLEY. I suppose that property has cost \$20,000 and more, but it is not worth that now, because they have built and rebuilt it. They tell me they do not hope to realize on the sale more than \$5,000 for it; but it is worth a good deal more than that to the State, and we want to continue using it without further expense to the Government.

Mr. WHITNEY. Before Mr. McNess begins, I want to say that I think the committee have been very kind to give us so much of their attention and hear us so thoroughly as they have, and as I have covered most of the ground, I think perhaps it would be well if you would ask Mr. McNess questions in regard to matters you want information upon, rather than to have any formal statement. Just as the committee thinks in regard to that, however.

Mr. BOWIE. I thought he might be able to condense the information that was in his own mind better than any other way, and we ask the questions as he goes along.

STATEMENT OF MR. GEORGE T. McNESS.

Mr. McNESS. Mr. Chairman and gentlemen of the committee, I can give you the details of the tobacco work of the Bureau in the different States, but I do not want to take up very much of your time.

The work is divided in six States. In Texas, Alabama, South Carolina, and Ohio we are trying to introduce the Cuban seed tobacco. In Connecticut we are continuing our work with the shade-grown wrapper tobaccos, and in Virginia, in Appomattox County, we are trying to improve the fire-cured heavy export tobacco, by better methods of cultivation and fertilization. In Texas we have three stations; one located in Palestine, in Anderson County, another at Nacogdoches, in Nacogdoches County, and the other at Crockett, in Houston County. The experiment work by the Bureau is practically finished, and the last year we devoted our attention and time to supervising the growing of tobacco amongst the farmers. In the three counties named 102 acres were planted by the farmers, and the representative of the Bureau visited every farmer once a week, or more often if necessary, and advised and helped him in the different operations necessary for the growing of the crop. The same class of work was also carried on at Marion, Ala., where 15 acres were grown by the farmers.

In Ohio 35 acres of Cuban tobacco were grown by the farmers under the supervision of the Bureau, and at the same time work was carried on to improve the quality of the native Ohio tobaccos by the introduction of fermentation. This work was begun as far back as 1896, when the Bureau was incorporated with 10 warehousemen and fermented 665,200 pounds of tobacco. In 1903 the amount of tobacco fermented under the supervision of the Government amounted to 4,204,000 pounds. In 1904 it increased to 10,208,000 pounds, and in 1905 it amounted to 23,169,000 pounds. As there are 36,000,000 pounds of tobacco grown in Ohio, you can see that fully two-thirds of the production of Ohio tobacco is now fermented and packed according to methods prescribed by the Bureau.

In Connecticut the work has been continued in the production of a shade-grown domestic-wrapper, having the qualities demanded by the

trade, and also adapted to the special climatic and soil conditions of the Connecticut Valley.

Last year 6 acres of tobacco were grown—4 acres on the plantation of the Hartford Tobacco Association and 2 acres at the Indian Head plantation—special attention being given to the selection of the seed and the breeding of the kind of tobacco adapted to the climate and soil. Eleven selections of tobacco were planted, seven selections from home-grown Sumatra seed and four selections from home-grown Cuban seed. The Sumatra tobacco yielded an average of 1,656 pounds an acre and the Cuban seed 1,384 pounds an acre, and the cost of producing this tobacco was 7 cents a pound; or the production of Sumatra was \$10.87 an acre and the Cuban tobacco \$9.68 an acre. This tobacco is the property of the Department, and it is the object to distribute this tobacco to the trade as soon as it is in fit condition, for the purpose of finding out which of these varieties will meet their requirements. As an example of the practical outcome of this work, I think it right to mention here the operations of the Hartford Tobacco Association. This is one of the principal companies engaged in the work of growing shade tobacco and an outcome of the Bureau's work in 1901 and 1902.

In 1904 this company was organized with a working capital of \$20,000, and planted 10 acres of shade tobacco and 76 acres of the Havana-seed tobacco or the native-wrapper variety. They obtained a yield of 1,400 pounds of shade tobacco to the acre, which sold from \$1 to \$1.50 a pound, or a net profit of about \$300 per acre. In 1905 the acreage was increased to 21 acres, 11 acres of this being planted from the Cuban seed and 10 acres from broad-leaf seed. The Cuban tobacco was sold for \$1,200 per acre and the broad-leaf tobacco for \$1,061.02 per acre, or a profit of \$353.65 per acre. On all, a profit of \$7,427.07 on 21 acres of tobacco. The treasury of the company now has \$60,000 and will distribute to the stockholders as dividends this coming month \$20,000 or 33½ per cent of the total funds used in two years' operations.

This work is purely the result of our experiments in Connecticut, and, as the professor stated to you gentlemen, in 1903 it was his intention to withdraw the experiments from the State, but owing to strong requests made from the growers there, the operations were continued, and the operations of this company show results that have been obtained in a practical commercial way from our experiments.

The CHAIRMAN. Is there any need of any further work there?

Mr. McNESS. Yes, there is. We are now engaged on breeding experiments. We have not exactly settled which type of tobacco is best adapted to that climate and soil and will at the same time meet the requirements of the trade. We now have eleven varieties of tobacco grown under shade, and before we can discontinue that work we must know from the trade which of those eleven varieties will meet the requirements.

Mr. WHITNEY. And then we have got to give them time to establish a market. On account of criticisms arising, over which we had not any control at all, the industry got into a very low condition, and while we had established a fine grade of tobacco it was not readily taken by the trade on account of prejudices, and we want to stay there long enough to overcome some of those prejudices. And I may state to the committee that for the first time in the history of the country, so far as I know, any considerable amount of cigar wrapper

tobacco has gone out; this one firm has sold 100 bales of tobacco to Germany of the lower grades—of the lower leaves, the sand leaves—which we do not use in this country at all, leaves that we have formerly thrown on our yards or on our fields because of their flimsiness (they not being adapted to our uses), but they are found to be adapted to a particular German trade, and, as I say, they sold 100 bales of this at prices ranging from 30 to 70 cents a pound, and Germany is willing to take any amount of that leaf that we produce. Of course it is not a grade of leaf that we want to produce, but it is a grade of leaf we always do produce in any tobacco crop.

Mr. McNESS. In Virginia the Bureau has for the past two years conducted an experiment of the heavy fire-cured leaf. Most of this leaf of lower grades is shipped to Austria, while a small percentage of the higher grades is used in this country for plug wrappers, and the object of our work was to improve, or rather increase, the amount of the higher grade of this tobacco, and consequently bring in a larger profit to the farmer per acre.

Last year we planted 5 acres of tobacco, 3 acres on the Cecil clay and 2 acres on the Cecil clay loam, and to demonstrate the possibilities of fertilizers we divided the 3-acre field into three 1-acre plots, giving each plot a different fertilizer treatment. Plot No. 1 we treated with a local fertilizer, the same as the farmers use. Plot No. 2 and plot No. 3 we fertilized with the formula we made up ourselves. The yield from plot No. 1 was 637 pounds; the yield from plot No. 2 was 1,000 pounds; the yield from plot No. 3 was 1,234 pounds.

Mr. LAMB. What county of Virginia was that?

Mr. McNESS. Appomattox County. The figures I have here will give the cost of production, labor, and profit. On plot No. 1 the cost of labor was \$35.61; fertilizer, \$5.25; gross returns, \$45.86; net profit, \$5 an acre (I believe that is about the average net profit that the farmer gets in that vicinity); per cent of profit, 8 per cent; average price obtained from the tobacco on that acre, 6 cents a pound. Plot No. 2 was fertilized with our own formula. The cost of labor was \$44.40; fertilizer, \$16.75; returns from the acre, \$82.15; net profit, \$21; per cent of profit, 34½ per cent.

The CHAIRMAN. On what?

Mr. McNESS. On an investment of \$82.15.

Mr. WADSWORTH. You mean 8 per cent profit on what?

Mr. McNESS. On just the cost of the crop.

Mr. WADSWORTH. On just the cost of the crop, not taking into account the value of the land?

Mr. McNESS. The value of the land is \$10 an acre. The average price obtained for the crop was 12 cents.

Mr. WADSWORTH. Double the other?

Mr. McNESS. The difference was on account of the fertilizer used, which was judiciously applied. The cultivation was the same. That fertilizer increased the yield and quality as well, as you can see by the price—6 cents.

Mr. HENRY. A difference between skillful and unskillful labor?

Mr. McNESS. Yes.

Mr. WADSWORTH. What is the experiment station of Virginia doing along those lines?

Mr. McNESS. Nothing in a practical way.

Mr. WHITNEY. They are outside the tobacco district.

Mr. WADSWORTH. But they are not confined to their immediate district in their work.

Mr. LAMB. We have not an experiment station in that tobacco field. You encountered there the sun cured tobacco. Those fellows have kind of a monopoly, have they not?

Mr. McNESS. Yes; that is in a very limited area, simply found in Louisa and Hanover counties. The area is very limited.

Mr. WADSWORTH. Why is not your experiment station doing some work there?

Mr. LAMB. We haven't the money. They spent all their money thirty or forty years ago, and haven't got any now; and then they are out of this area, too.

Mr. McNESS. You can see by this that the land on which this tobacco is grown is valued at the present time at from \$10 to \$15 an acre; but owing to the small percentage of profit that is made by the present methods of growing tobacco only a small profit is obtained. Now, in Virginia, we have 133,068 acres of land used for tobacco culture. The average yield is 734 pounds to the acre, producing 96,487,000 pounds, with an average farm value of 7½ cents.

Mr. LAMB. Virginia is the third State of the Union in tobacco.

Mr. McNESS. Yes. If your farmers would only follow our methods of culture, they could increase the value of their tobacco from 7½ cents to 12 cents, or from an average percentage of 8 per cent to 34½ per cent.

Mr. LAMB. And if they could get some reliable labor they would soon be the second, if not the first, State in tobacco.

Mr. McNESS. The labor proposition is of course the serious proposition.

Mr. WADSWORTH. I would like to know where it is not the serious problem, and I don't know where it is any more serious than in New York State.

Mr. McNESS. I think the labor proposition is worse in Virginia than anywhere else I know of.

Mr. LAMB. I know it is awful in the counties I represent. We are thinking about trying to get some from England now.

Mr. WADSWORTH. It is next to impossible to get farm labor with us. How much further are you going with that experiment?

Mr. McNESS. That experiment? We have not only to grow tobacco, but we have to carry on the local rotation of crops. The farmers claim it will not pay them to add extra fertilizer to their soil merely for a tobacco crop, and to convince them that it will we have to follow rotation, planting clover and wheat after the tobacco, to show them that they will get an increase in their clover and wheat by using commercial fertilizer.

Mr. WADSWORTH. You mean the fertilizer is put on for each crop?

Mr. McNESS. No, sir. We simply fertilize the tobacco crop, and then the wheat and clover will get what is left.

Mr. LAMB. Where can they get that formula?

Mr. McNESS. We can give them the formula.

Mr. LAMB. How does that compare with the price of the formula that they get from the North Carolina and Virginia Chemical Company?

Mr. McNESS. The prices will be the same, because the North Carolina or any other fertilizer company can take this formula and mix it for the farmer. In fact we purchase that formula from them.

Mr. LAMB. You must have put something in there that they didn't have?

Mr. McNESS. Yes, because we give the tobacco the plant food that it needs, whereas the fertilizer that the farmer uses ordinarily is not correctly proportioned.

Mr. LAMB. Why does not that North Carolina and Virginia chemical company do it? They have fine chemists.

Mr. McNESS. Here is the formula that was used. The local fertilizer as furnished by the company consists of 12 pounds of ammonia, 36 pounds of phosphoric acid, and 12 pounds of potash. That is not balanced right for tobacco; there is too much phosphoric acid in it and not enough ammonia, and not enough potash. Our formula is 72 pounds of ammonia, 57 pounds of phosphoric acid, and 75 pounds of potash. Potash and ammonia are the two ingredients that tobacco needs.

Mr. WADSWORTH. How could the farmers get that?

Mr. McNESS. It will be published in the bulletin.

Mr. WADSWORTH. But how can he get it—the article itself?

Mr. McNESS. He can buy that article from the fertilizer company.

Mr. WADSWORTH. That company will make it for him?

Mr. McNESS. Yes; that company will make it for him, or he can buy the crude ingredients and make it himself.

Mr. WADSWORTH. How expensive is that a ton?

Mr. McNESS. That will cost from about \$30 to \$35 a ton.

Mr. WADSWORTH. How much per acre?

Mr. McNESS. Sixteen dollars to the acre.

Mr. WADSWORTH. About half a ton to the acre.

Mr. McNESS. About half a ton to the acre.

Mr. WHITNEY. They are much heavier applications than they usually give.

Mr. McNESS. They usually give 400 pounds of commercial fertilizer to the acre?

Mr. WADSWORTH. And you advocate about four times as much?

Mr. McNESS. Yes; four times as much.

Mr. WADSWORTH. You say that fertilizer will last through and nourish the wheat and clover crops?

Mr. LAMB. They make good wheat after that.

Mr. McNESS. Yes; they make splendid wheat after it. That formula would give him 30 bushels of wheat to the acre.

Mr. WADSWORTH. That is a good deal of a guess, because wheat is subject to climatic influences.

Mr. McNESS. Certainly.

Mr. WADSWORTH. Which fertilizers can not control?

Mr. McNESS. Yes.

Mr. WADSWORTH. I suppose wheat this year will be very poor. It will be heaved out by these freezing nights and thawing days. How much longer do you propose to work in Virginia on that line?

Mr. McNESS. In Virginia we ought to work at least five years after we get through with the fine-grade tobacco. We want to take up the sun cured, and air cured, and the fire cured.

Mr. LAMB. Can you help the sun cured?

Mr. McNESS. Yes; in the same way we help the fire cured, and it is the same proposition.

Mr. LAMB. They are making money now?

Mr. McNESS. Yes, but they can make more.

Mr. LAMB. They have money in the bank in Richmond.

Mr. FIELD. Why don't the others make some of that tobacco?

Mr. LAMB. It is confined to a small area.

Mr. McNESS. It is confined to two counties north of Richmond.

Mr. LAMB. Well, there are three or four counties.

Mr. McNESS. Hanover and Louisa are the principal ones.

Mr. LAMB. And the upper part of Henrico.

Mr. McNESS. Yes. The fire cured requires a heavy soil. The sun cured and air cured are grown on a lighter soil. It will be impossible for the people around Lynchburg and other sections of the State to grow sun-cured tobacco, because their soil and conditions are not adapted to it.

Mr. WADSWORTH. Now, what is the next experiment you want to tell us about?

Mr. WHITNEY. I think what they want to know now is the prices they got for Texas tobacco and Alabama tobacco.

Mr. McNESS. Yes. The Texas tobacco grown last year by the farmers was sold to a firm of leaf dealers in Chicago, who contracted with the farmers for 15 cents a pound in the bundle—that is, in its air-cured condition. The tobacco after being packed sells on the market for 40 cents a pound.

Mr. LEVER. What did you do on your farm in South Carolina, or have you spoken of that?

Mr. McNESS. We grew three grades of tobacco in Orangeburg County. The tobacco is now being fermented, and as soon as it is in the right condition it will be distributed to the trade to find out their opinion. And until that time comes we can not advise the farmers whether that class of tobacco can be grown successfully or not. As far as the growth is concerned, we can grow a fine tobacco in South Carolina, but it requires the judgment of the trade as to the aroma and quality of the leaf, and we have to wait for that.

Mr. FIELD. With reference to that experiment work I would like to ask two or three questions. Is that being done in connection with the farmers or is it an independent Government experiment?

Mr. McNESS. It has been done with the farmers, but previous to last year it was an independent Government experiment.

Mr. FIELD. And did the Government use fertilizers in their experiments?

Mr. McNESS. Yes; we put cotton seed meal, 1,200 pounds to the acre, and 1,200 pounds of sulphate of potash.

Mr. FIELD. What was the result of that experiment? I mean the money profit per acre, or with reference to the percentage on the investment, not the value of the land.

Mr. WHITNEY. The tobacco cost about 9 cents a pound and sold for 15 cents.

Mr. McNESS. Yes; the tobacco cost 9 cents and sold for 15 cents, and gave an average yield of 600 pounds to the acre. That is \$36 to an acre net profit.

Mr. HENRY. That is grown from Cuban seed?

Mr. McNESS. Yes.

Mr. HENRY. How does it compare with the Cuban-grown tobacco? You sell it for 40 cents?

Mr. McNESS. It compares very well with the imported tobacco.

Mr. HENRY. I should think so, too.

Mr. McNESS. I have a letter here from some farmers in regard to the quality.

Mr. WHITNEY. Mr. Chairman, we have distributed the tobacco grown by the Department last year, or rather what was the year before last, now, to about 500 prominent manufacturers and dealers, and we have letters from nearly all of them critically describing their views as to the value of the tobacco. In the main they are very favorable. Some of them of course are unfavorable, but so many of them have been favorable, and so many men have seemed to take an interest in it, that the Department is very much encouraged.

Mr. McNESS. Here is a letter from Binghamton, N. Y., from a manufacturer, and letters from others. These all compare the quality of the Texas and Alabama tobacco with the Cuban product. There is no doubt whatever that we have produced in Texas and Alabama the best filler tobacco ever produced in this country.

Mr. FIELD. How does it compare with the domestic product from other sections?

Mr. McNESS. It is far superior.

Mr. FIELD. Far superior to any other domestic filler made?

Mr. McNESS. Yes; filler.

Mr. FIELD. Is it probable that the commercial value of that tobacco would be more recognized in the future, and a better price may be realized an acre?

Mr. McNESS. Yes; after this tobacco becomes known the chances are that the value will increase.

Mr. BOWIE. Did not the Florida people get 18 cents for their tobacco?

Mr. McNESS. The Florida people this year are getting as high as 32 cents.

Mr. BOWIE. That was for Cuban tobacco, though?

Mr. McNESS. Yes; for Cuban.

Mr. BOWIE. It is grown in Florida, but Cuban tobacco?

Mr. McNESS. It is grown in Florida, but from Cuban seed—the Cuban variety.

Mr. WHITNEY. Mr. Chairman, I think this is all that the Bureau desires to present to the committee. I wish to thank the committee for giving us the time and attention they have given, and we wish now to leave our interests in your hands.

(Thereupon, at 2 o'clock, the committee adjourned.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Tuesday, February 6, 1906.

STATEMENT OF MR. L. O. HOWARD, CHIEF OF BUREAU OF ENTOMOLOGY, DEPARTMENT OF AGRICULTURE.

The committee this day met at 10.45 o'clock, Hon. James W. Wadsworth in the chair.

The CHAIRMAN. The committee will come to order. Doctor Howard, we will proceed with you first. We will not wait for Mr. Hough, who was to be here this morning. He has not come.

Now, Doctor, we will first take up your salaries. We will spare your giving the reasons for the proposed increase of your own salary. Your innate modesty will forbid you speaking of it.

Mr. HOWARD. And the Executive order of the President forbids it, too.

The CHAIRMAN. One chief clerk, \$200 additional, submitted. Why do you propose to raise him?

Mr. HOWARD. He is the best chief clerk in the Department of Agriculture.

This one is a very much overworked man, not only as chief clerk, but also as disbursing officer of the Bureau. He keeps all the accounts.

Mr. HASKINS. Does he give bond?

Mr. HOWARD. No, sir; he does not handle the actual cash, but he keeps the accounts.

The CHAIRMAN. Is not that applicable to all the chief clerks?

Mr. HOWARD. I do not think so. They have somebody especially designated for that work. That is my impression. This man is a very efficient man, and he has had only \$1,800 for a few years. He is so tremendously overworked, and he is so likely to be lost to our Bureau if we do not increase his salary, that I have taken the liberty of recommending that increase. The fact that he has double work to do, however, is the principal argument.

The CHAIRMAN. Looking further down the list, I see you estimate for 3 clerks of class 1, an increase of 2, submitted. You had, therefore, only 1 clerk of class 1 before. That is a \$1,200 clerk.

Mr. HOWARD. I have only this to say in regard to that submitted increase, that owing to your increasing appropriations for the Bureau in the last year or two the clerical work has very much increased indeed and we have had no increase in the clerical force. The condition of affairs at the present time is such that during busy times, especially when the field men, of whom we have a great many, come in from the field, when they come in in the winter time to write up their reports, we find the clerical force is absolutely insufficient, and on several occasions we have been obliged to borrow clerks from other bureaus, and in some other cases we have had to secure some by temporary assignment from the Civil Service Commission.

The CHAIRMAN. In that cotton boll weevil appropriation, you had all the money there that you wanted to employ any needed clerical assistance with? You had a free hand there, had you not?

Mr. HOWARD. Yes; that is true; but we were very particular about using that fund only upon the cotton boll weevil investigation.

The CHAIRMAN. That was proper; but outside of that work, has the work of the Bureau increased largely?

Mr. HOWARD. Very considerably, sir. Our appropriation is over twice as much as it was three years ago.

The CHAIRMAN. Then that same reason applies to the next item of "5 clerks, at \$1,000 each, an increase of 2 submitted?"

Mr. HOWARD. Yes.

The CHAIRMAN. Then "2 messengers, at \$840 each, increase of 1, submitted, in lieu of 1 clerk at \$720, dropped?"

Mr. HOWARD. Yes; we would increase a clerk and appoint another clerk to one of these new positions, and then add a new messenger.

The CHAIRMAN. What do you do with the \$720 man?

Mr. HOWARD. Nothing. We drop that position, but the equivalent to the \$720 place—

The CHAIRMAN. Is not that a promotion of the \$720 man to \$840?

Mr. HOWARD. Practically so, but it gives us another messenger.

The CHAIRMAN. Who does the work now that would be done by the \$840 man?

Mr. HOWARD. He will go up to one of the new \$1,000 positions. That will be done if you give it to us.

The CHAIRMAN. You say one is dropped. He is not dropped.

Mr. HOWARD. A \$720 position will be dropped from the rolls.

Mr. HENRY. He is promoted to \$1,000?

Mr. HOWARD. What I meant by that was that the position was dropped from the roll, not that the man was dropped. It was not intended to convey a misleading impression at all. In regard to the messenger, we have one building away over at the corner of Ninth street and another over at Twelfth street and three between those two, and there is a great deal of messenger work in going back and forth between them.

Mr. HENRY. When you get into the new building will you need so many messengers?

Mr. HOWARD. No, sir; we will not need them when we get in the new building.

The CHAIRMAN. Now, we will take up your general expenses, Bureau of Entomology.

Mr. HOWARD. Would you have any objection if we introduced that supplementary appropriation requested by the Secretary in regard to the cotton boll weevil?

The CHAIRMAN. No, sir.

Mr. HOWARD. The Secretary of Agriculture wrote this letter to you:

JANUARY 15, 1906.

HON. JAMES W. WADSWORTH,

Chairman Committee on Agriculture, House of Representatives.

SIR: I inclose herewith an estimate for the continuation of the cotton-boll weevil investigations under the Bureau of Entomology. By inadvertence this was omitted from my official estimates. The importance of this matter is so great that it will probably at once appeal to you, and I hope that you will have the clause inserted in the bill without further formality. If you deem it necessary, however, I will have a supplementary estimate made in due form through the Treasury Department.

I inclose with the estimate a condensed statement of the reasons therefor, which you may place before the committee if you deem it desirable.

Respectfully, yours,

JAMES WILSON, *Secretary.*

NECESSITY FOR THE CONTINUANCE OF THE ENTOMOLOGICAL WORK ON THE COTTON-BOLL WEEVIL.

The boll weevil continues to spread in the Southern States. It is invading a very important cotton-producing region, where the damage will undoubtedly be greater than in the territory infested up to this time on account of climatic conditions, which will cause changes in the habits of the pest. There is need for experiments with parasites and diseases in the new region, for the collection of data regarding its status and damage from time to time, for the testing of new remedies that may be suggested, and for the completion of many lines of experiments now under way.

Specifically, the following reasons for the continuance of the work may be mentioned:

(1) The pest is invading the most important cotton-producing region, where the climatic conditions will result in greater damage than has been done in Texas. These conditions will also tend to nullify the efficacy of the cultural remedy.

(2) There is the most urgent need for experiments with parasites and diseases in the new region, where they may be found more effective than in Texas.

(3) The demand on the part of the cotton trade and interested parties generally for information as to the status and spread of the weevil still exists and will undoubtedly continue to exist.

(4) Many persons will be offering suggestions as to remedies which should be tested.

(5) Much remains to be learned as to the changing habits of the pest in Texas, necessitating the continuance of a field laboratory and field experimental work.

(6) Many lines of experiments, some of them in cooperation with the Mexican governmental commission, which require work over a series of years, are under way. Not only what has been accomplished along these lines, but what might be obtained in the future, would be sacrificed by a discontinuance of the entomological investigation at this time.

The work done up to the present time has resulted in the cultural method of lessening damage. The success of this method, perfected in Texas, depends very largely upon the climatic conditions existing there. The respects in which the climatic conditions in regions about to be invaded will affect the boll weevil will undoubtedly interfere vitally with the application of the method found effective hitherto. This danger is already appreciated by many planters in Texas. Several of these, who also have holdings in Mississippi and Alabama, are known to have disposed of them, although they have no intention of abandoning their cotton farms in Texas.

In the moister valleys of Texas, despite the present system of control, cotton production can not be carried on with any considerable degree of certainty. In Louisiana, Mississippi, and Alabama the rainfall is uniformly greater than in the regions where the greatest losses have occurred in Texas, and it is seriously to be feared that the present means will not permit the profitable cultivation of the crop. As a matter of fact, the boll-weevil problem, as it regards the cotton States in general, is not yet fully solved. On the contrary, the most critical time is approaching. There is, of course, the necessity for the continuance of the indirect work on the weevil problem, such as the encouragement of diversification, but the direct work on the pest conducted by the Bureau of Entomology is certainly of at least equal importance. Moreover, this direct work is absolutely essential and the necessary preliminary to the indirect work.

The present situation also seems to require additional work on the cotton bollworm and other cotton insects. These have already increased largely in importance in Texas, where their ravages add to the difficulty of cotton production caused by the boll weevil. In regions where the latter pest is certain to be a more serious menace than in Texas the importance of the other insect enemies of the cotton plant is proportionately increased.

SPECIAL COTTON AND COTTON BOLL WEEVIL INVESTIGATIONS.

To enable the Secretary of Agriculture to meet the emergency caused by the continued spread of the Mexican cotton boll weevil in the Southern States by further studies of the habits and damage of the pest, the collection of data regarding its status, the study of parasites and diseases, the testing of remedies suggested, and the completion of experiments now under way, \$85,000, or so much thereof as may be necessary. And the Secretary of Agriculture is hereby authorized to expend said appropriation in such manner as he shall deem best, in cooperation with the State experiment stations and practical cotton growers.

NOTE.—Of the special appropriation of \$190,000 which was made for the fiscal year ended June 30, 1906, \$85,000 has been used by the Bureau of Entomology in the direct study of the pest, including field experimental work on a large scale to determine the best methods of combating it. As the pest continues to spread in the United States, and is changing its habits materially, it is recommended that this appropriation be continued, not as a separate item, but as a part of the regular funds for the Bureau of Entomology. On account of the new conditions in important cotton-producing areas that are about to be invaded, it is most important that the investigations along the lines mentioned be continued.

You will remember that you made a special appropriation last year of \$190,000.

The CHAIRMAN. Yes.

Mr. HOWARD. That, by direction of the Secretary of Agriculture, was divided into two parts, respectively \$105,000 and \$85,000. That \$105,000 to be expended by the Bureau of Plant Industry has been

estimated for in the coming year in the bill under the head of the regular appropriation. It was the intention of the Secretary to make a similar estimate of \$85,000 for the Bureau of Entomology, but it was omitted, and this letter of the Secretary is intended to remedy that mistake.

The CHAIRMAN. In the Bureau of Plant Industry it is a special appropriation, and according to that letter you want it embodied in your general appropriation?

Mr. HOWARD. Either that or a special appropriation. It comes in at the end of the Bureau. It is called a special cotton investigation.

Mr. LAMB. That is in addition to the regular estimate?

Mr. HOWARD. Yes. The Bureau of Plant Industry asked for \$105,000 for special cotton investigations at the end of their other appropriation, and in the same way we have headed this "special cotton boll weevil investigation" to be added in the same way to the Bureau of Entomology. As to the reason and desirability of that I desire very much to have Mr. Hunter speak to you. He has had charge of that investigation for four years.

The CHAIRMAN. You got \$190,000 last year. Is there not some portion of the work that is completed and finished up?

Mr. HOWARD. We find we can use the same amount, \$80,000, very usefully.

The CHAIRMAN. You can use it for twenty years, for that matter, if we give it to you. That appropriation started with \$225,000, did it not?

Mr. HOWARD. Two hundred and fifty thousand dollars.

The CHAIRMAN. And you concluded at the end of two years that \$190,000 would do. Can you not conclude at the end of another year if something less will do?

Mr. HOWARD. Did you ask Doctor Galloway that?

The CHAIRMAN. Yes.

Mr. HOWARD. Did he say it could be reduced?

The CHAIRMAN. No, sir.

Mr. LAMB. He did not say that.

Mr. HOWARD. The point arises that new problems are coming up all the time, and as the weevil extends its way into new territory it is necessary to cope with it. It is now over in Louisiana and on the Mississippi border, and the conditions are radically different from those that obtained in Texas. The weevil is changing its habits. We are constantly finding that we have new factors to deal with. We have to tackle the new aspects of the investigation. The exact particulars can be explained by Mr. Hunter very readily.

Mr. LAMB. I had hoped that the red ant had eaten the cotton boll weevil up.

The CHAIRMAN. We will get through with you first, Doctor, before hearing Doctor Hunter.

Mr. HOWARD. Very good.

The CHAIRMAN. Now, we have been taking these items by paragraphs. The next item is:

Promotion of economic entomology; investigating the history and habits of insects injurious and beneficial to agriculture, horticulture, and arboriculture; ascertaining the best means of destroying those found to be injurious, including an investigation into the ravages of insects affecting field crops.

Suppose you tell us, Doctor, what work you have been doing along those lines in the last year. There are some new members on the committee who will be interested in it, not to mention some of the old members. What special work have you been doing? If you have any new work, tell us about that, too.

Mr. HOWARD. We have handled the work in regard to the investigation of injurious insects under several different heads. We have a force of experts engaged entirely upon the subject of insects injurious to forest trees and forest products. The head of that forest investigation is Doctor Hopkins, who is here to-day, and I hope he will be given an opportunity to speak.

Then we have investigations of forest insects, deciduous fruit insects, and another is the investigation of insects affecting field crops, grass, clover, and vegetable crops. Then in addition to that we are doing some work in silk culture and bee culture. In each of these investigations we have several men engaged with their assistants in focusing their entire attention upon these problems.

For example, in the study of field crops and insects injurious to grain and grass the men have been studying those problems during the past year in a broad way, particularly the subject of the Hessian fly, all over the country.

The Hessian fly has made its appearance in the spring-wheat region of the Northwest, contrary to all predictions, in the last few years, and it has changed its habits so as to require experimentation in the remedial work. The idea has become current that the Hessian fly can be avoided by late planting. We have entered into cooperation with certain agricultural experiment stations and with certain individual farmers covering the whole wheat region, and the experiments are carried on in the dates of planting, and they are coming to the conclusion that it is perfectly possible to ascertain in any given region the proper date of planting, so as to avoid damage from the Hessian fly.

The CHAIRMAN. That was discovered in my country five or six years ago, when we had it, and we have not had the Hessian fly since.

Mr. HOWARD. Yes, that is true, but we are trying to get at the definite dates applicable to all parts of the country.

The CHAIRMAN. You can not get a definite date for all parts of the country. That will vary with the climate in each section.

Mr. HOWARD. You can get a limit on the one hand and a limit on the other. By watching the conditions we can tabulate those conditions and ascertain the dates.

The CHAIRMAN. We have not had the Hessian fly in our wheat region for five years. I have not heard any complaint of it, anyway.

Mr. HOWARD. That is not a great wheat country in western New York.

The CHAIRMAN. I have not heard of it in the West, either—Ohio, Indiana, or Illinois.

Mr. HOWARD. Oh, yes; it has done considerable damage in several parts of the West.

Another point we have been handling is the parasites of the Hessian fly. That is a very curious thing. There was an outbreak of Hessian fly last fall in portions of Tennessee, and they brought down from South Dakota a lot of wheat infected by Hessian fly, but those fellows were all being carried off by parasites. They brought it down and

planted it there, and now it is hoped that these parasites, which do not exist in great numbers in Tennessee, will breed from those brought down from South Dakota and thus destroy the Hessian fly in Tennessee.

Then, they are studying the joint-worm problem and several others in the same way in regard to deciduous fruits. The men have established three stations—one in the North, one in the middle country (Washington and Maryland), and one in the South. They are experimenting with remedies for San Jose scale and the peach-tree borer and the plum curculio, and they are finding out things about them concerning their life history and the best method of attacking these creatures. I would like to file with the clerk, if you please, a little statement regarding that question of dates of sowing wheat, showing the results that have actually been accomplished.

The CHAIRMAN. Very well.

[Memorandum filed by Mr. Howard.]

Work accomplished during the past year and plans for the coming year by the division of cereal and forage-plant insect investigations.

Since the publication of results obtained by the Division of Entomology from 1884 to 1890, and experiments with the late sowing of wheat in the fall to evade attack of Hessian fly, there has been growing up among farmers the idea that in late sowing lay the most practical means to evading fall attack of Hessian fly, and if they could avoid this fall attack there would be none the following spring. There has since that time been a question as to what late sowing really implied in different localities.

In 1903 was begun a system of experimental sowings that was intended to cover the entire breadth of the wheat belt, with the hope of determining how early in the fall wheat might be sown in different latitudes and escape the attack of this pest. These experiments are being carried out under our direction by the most intelligent and successful farmers whose services can be secured in desirable localities, and are as follows:

Sault Ste. Marie, Mich., A. Peterkin; Bellaire, Mich., Jno. Bush; Clare, Mich., C. W. Perry; Lansing, Mich., Edward Hume; Hudson, Mich., C. A. Jewell; Rockaway, Ohio, J. T. Robinson; Andover, Ohio, A. Kingsley; Nicholasville, Ohio, Lowell Roudebush; Richmond, Ind., W. S. Ratliff; Nashville, Tenn., Jno. Thompson; Dublin, Va., J. D. Stearnes.

In the fall of 1904 the results of these experiments were found to be so encouraging that the following sowing stations were added: Fulton, Ky., R. E. Kelly; Knoxville, Tenn., State experiment station; Ringgold, Adairsville, Cornelia, Pomona, Ga., Georgia State crop pest commission; Newberry, S. C., Prof. Thos. Keitt, Clemson College; Charlotte, N. C., Jno. McDowell; Greensboro, N. C., Dan. Coble.

Although, as will be observed, none of these stations have been established more than two years, and some of them but one year, within this comparatively limited period we have found that the Hessian fly appears in the fall uniformly later from northern Michigan to central Georgia, and that wheat may be sown with safety the last of August and first of September in the northern part of the southern peninsula of Michigan, but it is unsafe to do so in Georgia and South Carolina before the first to the middle of November. Without going into details, it may be said that there is such a uniformity in this retardation that there is every indication that after these experiments have been carried on for a few years in connection with the observations of the United States Weather Bureau it will be possible for the farmer to determine within a few days the time in the fall when he can sow his wheat with comparatively little danger from Hessian fly attack.

A very serious outbreak of Hessian fly occurred in extreme western Kentucky and Tennessee during the last year. We have had this outbreak under investigation only since the spring of 1904, but we have made sufficient progress to show that if the farmers of that section had been in possession of the information that we have since secured relative to this outbreak of Hessian fly they might have saved a larger portion of their wheat crop, amounting to hundreds of thousands of bushels. The truth of this statement is witnessed by the fact that last year in the vicinity of Morris, Ill., the wheat crop was very seriously damaged by the fly. Following the advice given them by one of the agents of this division, the entire community delayed their

sowing until after what we decided would probably be a safe date. The result is that a thorough investigation of the wheat fields in that neighborhood has shown such to be almost entirely uninfested. In no case is there sufficient fly to cause the loss of a bushel of grain in this neighborhood.

This work in the region of fall wheat sowing has occupied considerable of my own time, as well as that of one of my assistants, Mr. Phillips, who has also been charged with the investigation of certain species of jointworm that affect both grain and grasses. He has found that a jointworm in timothy causes loss to the timothy seed crop of from 10 to 20 per cent, and a loss (not definitely determined) to the hay crop. It has become highly important that we know whether these insects may transfer their attention from the wild grasses to the cultivated ones, as we also find a similar one destructive to the blue grass, and also whether they will spread from grasses to grains. Mr. Phillips has spent considerable time in this, as I have also, and we now have material from almost every State east of the Rocky Mountains, from which we are breeding these insects with the expectation of finding out the food plant of each and gaining a knowledge as to what extent they are injuring grain crops and forage grasses.

Mr. George I. Reeves was sent early in the spring of last year to North Dakota to attempt to find out the life history of the Hessian fly, which has been causing serious losses in the spring wheat fields of that region. Mr. Reeves gave almost his undivided attention to this problem, with the result of finding that the fly differs considerably in habits from what it does in the fall-growing wheat sections. There are two broods of fly attacking spring wheat, following each other in close succession, and other flies emerge from the stubble of the year before during the entire summer. This is without a precedent, so far as we know, in this or any other country.

In order to determine the advisability or necessity for establishing a series of these experimental sowings west of the Mississippi River, it has been necessary to learn the area covered by Hessian fly in that country. Much to our surprise, we have failed to find any trace of it in Oklahoma, Indian Territory, or anywhere south of the Arkansas River, so that hereafter all depredations ascribed to the Hessian fly coming from that country will require different advice, as the damage is, in all probability due to other insects not amenable to the same measures as the Hessian fly.

The time has come when the farmer in the Northwest must raise some crop other than wheat, and he naturally is turning his attention to timothy and clover. Thus it is that a knowledge of the insects affecting these will be of the utmost importance to him. For this reason, extensive investigations are being made of the enemies of timothy and red clover. It will be observed that none of this work is far advanced toward completion, for the reason that the time during which attention has been given it has been too limited, but results so far secured seem to have vastly more than repaid the expenditure of time and money.

During the past year the corn-ear worm has been excessively abundant in the Northwest, where corn culture is as yet in the experimental stage, and it seems imperative that we should learn, if possible, whether or not the same repressive measures will apply here as in the South.

It is imperative that we know more of the habits of the parasites of the Hessian fly in the spring-wheat region. At present one little parasite seems to be holding the Hessian fly in check, and upon the number of broods of this will depend the value of burning the stubble as a preventive measure. Cut-worms are becoming every year more destructive, in both the corn and wheat fields, but we know almost nothing of their habits in that northern country.

Nothing whatever has so far been done in the investigation of alfalfa insects, owing to a lack of funds. We are almost totally unable to answer any questions relating to the insects affecting this important forage crop.

The corn root aphid has come to be a most important factor in corn growing, and the loss that it causes is enormous. Only enough has been learned of its habits to show that very much of this may be saved by carrying out certain cultural methods, but we can do nothing with this, owing to the fact that neither funds nor assistants for carrying out experiments are available.

The blue grass is attacked from Maine to Indiana, and perhaps further west, by an insect of which we know almost nothing, but are not in a position at present to investigate.

A small insect has broken out occasionally in widely distant localities and destroyed the young corn over hundreds of acres. These outbreaks have occurred in Ohio, Kansas, and in the South. It would seem imperative that we learn something of the nature of this insect, in order to be able to give farmers desired information, but at present this can not be done. Then, too, we find that it is becoming impossible to raise rye in New England on account of jointworm, and this demands a further investigation.

We hope sufficient additional funds are given us to continue this line of experimental wheat sowings from southern Virginia up through Virginia, Maryland, Pennsylvania, and New York during the fiscal year of 1906-7, and unless additional funds can be given us not only will this be impossible, but at this time it is doubtful if we can continue to carry on those already established. The grain and forage crops of the United States are of the most valuable and of the greatest importance, and the loss from insect attack here is greater than anywhere else. A large percentage of this can be prevented throughout every State in the Union if we can only have sufficient funds to make extended studies of these insects. At present it has been absolutely impossible to do anything at all on the Pacific coast for lack of funds.

Result of experimental wheat sowings to avoid Hessian fly attack.

Location of plats.	Date of safety for sowing.	
	1904.	1905.
Sault Ste. Marie, Mich...	No fly	No fly.
Bellaire, Mich.....	Between Aug. 30 and Sept. 9; only a trace of fly.	Between Aug. 30 and Sept. 9; fly more abundant.
Clare, Mich.....	Between Sept. 4 and 19; break in plats here.	Between Sept. 5 and 10.
Lansing, Mich.....	Sept. 17; very few fly	Between Sept. 17 and 20.
Hudson, Mich.....	Between Sept. 10 and 20	Between Sept. 16 and 23.
Rockaway, Ohio.....	Probably after Sept. 22; only few fly this year.	Sept. 20.
Andover, Ohio.....	Between Sept. 10 and 14	Between Sept. 15 and 20.
Nicholsville, Ohio.....	Sept. 20.	Sept. 20.
Richmond, Ind.....	Sept. 30.	Sept. 23.
Fulton, Ky.....	No experiment.	Oct. 9.
Nashville, Tenn.....	Very few fly	Oct. 12.
Knoxville, Tenn.....	No fly	No fly.
Ringgold, Ga.....	No experiments.	Between Oct. 18 and 21.
Adairsville, Ga.....	do.	Oct. 9 to 19.
Pomona, Ga.....	do.	Oct. 5 to 13.
Cornelia, Ga.....	do.	Too few fly to estimate.
Newberry, S. C.....	do.	Very few fly; no fly after Oct. 11.
Charlotte, N. C.....	do.	Do.
Greensboro, N. C.....	do.	Very few fly; no fly after Oct. 20.
Dublin, Va.....	Between Sept. 27 and Oct. 1; very dry.	Between Sept. 11 and 22; very wet.

Now, the fruit interests of the country are becoming more and more important each year. According to the census of 1900, there were 367,164,694 bearing deciduous fruit trees, and the crop for 1899, a poor fruit year, was valued at somewhat more than \$100,000,000.

Of all crops fruit, perhaps, suffers most severely from insect depredations, and their control is absolutely necessary for the production of profitable crops. Fruit growers suffer a loss of quite \$30,000,000 annually from insect pests.

Although much work has already been done in the study of insects injurious to orchard crops by the Bureau of Entomology and experiment station and other entomologists, there yet remains an enormous field for investigation along this line. There are scarcely any of our common orchard pests but which, from their importance, should be thoroughly reinvestigated, especially according to a systematic plan carried on in the principal fruit sections of the country. A systematic effort should be made to induce the more general use by orchardists of means now known to be effective in reducing insect injury. Demonstration work of this character could, perhaps, be properly undertaken by this Bureau in cooperation with State and station entomologists.

At the present time this section is engaged in a special study of the insect pests of the peach. Other orchard pests, however, are not neglected, as they become abundant and offer opportunity for work. In the investigation of peach insects it was thought best to establish field stations in northern and southern localities in the midst of the

fruit belts of those respective sections, and investigations for this latitude were made in near-by orchards in Maryland and Virginia. A field station was maintained last year in Niagara County (Youngstown), N. Y., and also in Georgia (Fort Valley). The same plan of work was adhered to in the field stations and at Washington, so that differences in life history and habits and results of treatment due to climatic or other conditions would be brought out. There is much discrepancy at present in our literature in regard to the effectiveness of a given remedy as reported upon from various sections of the country, and the carrying out of the work over a considerable range of territory will be calculated to explain the discrepancies. Special attention was given to the San Jose scale, plum curculio, and peach-tree borer; but several other peach insects were investigated. Attention was also given to the codling moth, pear Psylla, quince curculio, apple-bud moth, fruit-tree bark-beetle, and others.

The work with the San Jose scale was confined largely to an investigation of the lime-sulphur-salt wash as a treatment for this insect. As at present recommended and used there is apparently much waste of material from a lack of definite information as to the proportions and quantities of the respective ingredients necessary. In order to get information on the best formula twenty-two different washes were tested with respect to their efficiency in killing the scale. A chemical study of several of these washes is in progress in cooperation with the Bureau of Chemistry. Last year's work showed that any wash containing less than 20 pounds of lime and 15 pounds of sulphur to 50 gallons of water would not be satisfactory in killing the scale, and a wash containing 5 pounds more of each of the ingredients to 50 gallons of water was sufficiently more effective to warrant the additional cost of materials. The use of salt appears not to be necessary. These washes were tested on apple in Niagara County, N. Y.; on peach, apple, and plum in Maryland, in cooperation with the entomologist of the Maryland experiment station, and on peach at Fort Valley, Ga.

The work with the plum curculio has included an investigation of its life history, habits, parasites, etc., in the respective sections mentioned. Experiments were made with preventive and remedial measures, including spraying apple, plum, and peach with arsenicals and jarring. Plums, apples, and peaches were secured from correspondents from many parts of the United States and examined as to their infestation or not with this insect, as bearing on its geographical distribution.

Work with the peach-tree borer last year was confined mostly to a study of its life history, especially the determination of the period of emergence and oviposition of the moths, as bearing on the time to undertake preventive measures. It was found that the moths emerge in New York State largely between July 15 and August 15; in the latitude of Washington, between June 15 and September 15, and in the latitude of Fort Valley, from about July 1 to September 1. The late emergence of the moth in the South is contrary to the opinion heretofore accepted on this point in that they were believed to emerge as early as the middle of May. A large series of experiments in the control of the peach-tree borer is planned for the present year, based on the information secured last season.

The increasing difficulty experienced in securing the use from orchardists of trees for experimental purposes has necessitated the establish-

ment of an experimental orchard in connection with the present investigation. An orchard of some 11 acres, including the principal varieties of fruits, was planted last spring on the Arlington farm, and will soon be of sufficient age for experimental work.

Studies of insect pests of wide distribution, as those above mentioned, could profitably be extended to other fruit sections, as in Missouri, in Colorado, or on the Pacific slope. An investigation of a given pest extended over such a range of territory when completed should furnish information valuable for all sections, and would therefore be correspondingly more valuable. The establishment of additional field stations in the sections just mentioned would, moreover, really constitute demonstration work, and should do much to encourage the orchardist in his warfare against insects.

It is planned to continue the field stations the present year in New York at Westfield, in Chautauqua County, and in Georgia at Myrtle, near Fort Valley.

The CHAIRMAN. Now, what other insects have you studied affecting field crops?

Mr. HOWARD. As I say, we have studied the jointworm, and the clover root weevil, and the corn-root aphid—a thing which the farmers knew very little about.

Mr. LAMB. What is that?

Mr. HOWARD. A plant louse. It breeds on the early roots of corn. It is a small insect about the size of the head of a pin.

Mr. ADAMS. Where do you find that?

Mr. HOWARD. It is generally distributed, but mainly in the Mississippi Valley.

Mr. FIELD. Is it ever called the wire worm?

Mr. HOWARD. No, sir; that is a different insect. Then there is a new insect affecting the blue grass, and others. I want more money for the field-crop work. We have been hampered in our work for lack of money. Professor Webster wants to go further into the alfalfa insects, the corn-root worm, and so forth.

Mr. ADAMS. Was this gentleman who was sent to Guatamala to look into the matter of the Guatamala ant—was he sent under your Bureau or by the Secretary?

Mr. HOWARD. He was sent originally under the Bureau of Plant Industry.

The CHAIRMAN. You say you want funds. This has been in the bill every year for some years. Have not some of these investigations been completed, so that the money could be used for other purposes?

Mr. HOWARD. It is a progressive work, and money has to be expended on it all the time.

The CHAIRMAN. After you have discovered a remedy and published it, what do you propose to do?

Mr. HOWARD. Take up some new insect affecting some other class of crops.

The CHAIRMAN. Have you not finished up the work on many insects?

Mr. HOWARD. Oh, yes; we have published bulletins on the chinch bug and the Hessian fly and others, but those things are not absolutely complete. We are always finding out new things about them.

Mr. LEVER. What kind of insect did you discover down at Batesburg, S. C., in my district?

Mr. HOWARD. It was called a red spider, which occurs on the cotton leaves and causes a rust on the leaves.

Mr. LEVER. A withering of the leaves?

Mr. HOWARD. Yes.

Mr. LEVER. Did you find any remedy for that?

Mr. HOWARD. We are now studying the life history of the thing to find out how it lives. It must live on some other plant. The cotton is an annual plant, and the inquiry now is to find out how the insect lives from year to year.

Mr. LEVER. I believe you recommend the planting every other row in some other crop. Has this been done?

Mr. HOWARD. I have not had the report from that yet.

The CHAIRMAN. How much increase do you propose to use for that—for ravages of insects affecting field crops?

Mr. HOWARD. I assigned to that work last year \$6,300. We wish you to give \$3,700 more, making a total of \$10,000 for that class of work. The work is so widespread that we need one or two more good men to do the traveling and looking out after different stations, and some other laboratory men to take up these other questions that we have not been able to investigate for want of funds.

The CHAIRMAN. Now, let us pass to the next clause, "Investigation of the insects affecting small fruits, shade trees, and truck crops, forests and forest products, and stored products." How about truck crops and stored grains?

Mr. HOWARD. Only one man in the Bureau has been working, single handed, in that branch of work for the last seven or eight years. He has published a number of bulletins, for which there is a great demand. He has published one or two bulletins affecting stored grains, but it is time for him to have assistance. We want to do some remedial experimentation on a large scale. It is all very well to study the insect and find out its life history and to see from this life history what should be done with it. We can conduct an experiment to see what will kill it, but that is not convincing. We must show in the granary and in the field that it is practicable from a business standpoint in a large way.

The CHAIRMAN. Now, take up insects affecting small fruits. What have you done on that line?

Mr. HOWARD. Nothing much, except to study theoretical remedies and study the life histories of the insects.

The CHAIRMAN. What insects have you?

Mr. HOWARD. The raspberry saw fly, and currant worms of different kinds. The old currant worm is well understood and can be handled easily. Then we have the strawberry weevil, which prevents the making of fruit. That has been studied with considerable care. Then there are a number of others—

The CHAIRMAN. Now, what have you done with regard to the insects which destroy shade trees?

Mr. HOWARD. We have under preparation a large bulletin covering practically all the insects that affect shade trees in the United States. At the same time the thing is incomplete, because we have not been able to get the life histories of all the insects that affect shade trees. You know there is an almost infinite number of shade-tree insects. Our own city of Washington here shows a great want of knowledge on the part of the parking commission regarding shade trees.

Mr. HENRY. How do you account for the disappearance of the elm-tree beetle, which was prevalent three years ago and which now, for the last two or three years, is scarcely to be seen?

Mr. HOWARD. It is almost impossible to account for it, Mr. Henry. It will come back next year or perhaps the year after.

Mr. HENRY. We had a wet season in 1903.

Mr. HOWARD. The reason is undoubtedly climatic. The birds do not affect the elm-leaf beetle, and there is scarcely anything that eats it. There are no fungus diseases that kill it. It is practically immune.

Mr. HENRY. Its disappearance is not due to a parasite or anything of that kind?

Mr. HOWARD. No, sir; it is not due to a parasite. We are sure of that.

The CHAIRMAN. Now, as to insects affecting truck crops. Take up the subject of truck crops. What parasites are found attacking them?

Mr. HOWARD. One or two new ones have come up in the last two years. A new cabbage worm in Georgia has been doing considerable damage. The man who has charge of that line of investigation has been working single-handed all this year, and at the present time has, perhaps, fifteen or twenty insects on truck crops, studying them and studying their life histories to see where they can best be attacked.

The old and well-known things, like the Colorado potato beetle and the cabbage worm, are so well understood that we do not trouble ourselves about them any more. But there are a number of things very difficult to handle. Take, for example, the blister beetle that attacks the potato crop and the beet crop.

Mr. HENRY. You spoke of the wireworm as attacking the corn. Have you any remedy for that?

Mr. HOWARD. It is one of the most difficult insects we have to fight. It can be handled on a small farm or in a small village quite easily, but when it comes to a large farm it is so difficult that it can not be handled very well. We have handled the wireworm by means of poisoned bait, which is put out on the field before the crop comes up, the same as we handle the cutworm. We poison with arsenic a certain amount of grasses or weeds and put them out in little bunches over the field, and in that way the field is rid of cutworms before the crop comes up.

Mr. HENRY. Do you treat the wireworm the same way?

Mr. HOWARD. Yes.

Mr. FIELD. Is not an easy way to secure a stand to put a large amount of grain in the ground?

Mr. HOWARD. Yes; but you do not get rid of the cutworms by that method.

The CHAIRMAN. Before we leave those insects that are injurious to trees and fruits, and so forth, let me ask you, don't you think, Doctor, from the commercial standpoint, that in view of the present low price of fruit all over the country, you are well in advance of the needs of the country in this respect?

Mr. HOWARD. I do not think you would say so if you saw our correspondence.

The CHAIRMAN. I do not attach much importance to that correspondence. They write you letters on everything. If you will look at the commercial price of fruit you would not suppose these fruit insects traveling over the country did very much damage. But if you con-

sidered the ravages of these insects from your point of view, one would suppose the price of fruits would necessarily be very high. Instead of that, however, the prices are in fact low. As I said one day to Doctor Wiley, "If you find a way of preventing hog cholera, hogs will be worth only 2 cents a pound." The point I want to make is, is not your Bureau well up to the needs of the time commercially? You may get away ahead of it and have to come back, as you have had to do in the silk business.

Mr. HOWARD. We can not look at it that way. We must find remedies.

Mr. HAUGEN. To what extent have you been experimenting with cutworms, and with what success?

Mr. HOWARD. We have not done anything for some years, but under our direction some years ago it was experimented on on quite a large scale.

Mr. HAUGEN. With success?

Mr. HOWARD. Yes; with success.

Mr. HAUGEN. Is it very expensive?

Mr. HOWARD. No; very reasonable, indeed, on truck farms.

Mr. HAUGEN. That would not apply to a large property?

Mr. HOWARD. No, sir. In regard to that apple question, the fruit question, I know a man about 100 miles from Washington, down in Virginia, who has a choice orchard of apples. He keeps his orchard free from insects and scab, while his neighbors do not do it. He follows our methods, but they do not. He sells his crop every year for a very remunerative price.

The CHAIRMAN. Does not that come under the plant industry?

Mr. HOWARD. Yes; the scab does.

The CHAIRMAN. Is not that covered by spraying?

Mr. HOWARD. Yes; by different mixtures. This man sells his crops for high prices.

The CHAIRMAN. Yes. You can bring horses to water, but you can not make them drink. If men will not profit by the example of their neighbors, I do not see how we can take them by the throats and make them do it.

Mr. HOWARD. This is all we can do. We can show them an example.

The CHAIRMAN. What have you done with forests and forest products? Is that in collaboration with the Bureau of Forestry?

Mr. HOWARD. It is in cooperation with the Bureau of Forestry. Until you were good enough to give us a little additional money two years ago it was done partly at the expense of the Bureau of Forestry and partly at our expense. You have increased our appropriation, and now we have done that at our own expense. I have taken the liberty of bringing Doctor Hopkins with me. He has charge of that branch of the work.

The CHAIRMAN. We will hear him after we get through with you.

Now, the next item is "Investigation of insects in relation to diseases of men and domestic animals and as animal parasites." Does that take up the Texas tick?

Mr. HOWARD. There has been a considerable demand, particularly in the South, starting, I think, with the Tennessee and Louisiana stations, to have our Bureau take up the life history of the cattle tick all through the cattle-tick section, the idea being that the investigation of the rotation of pasturage for the eradication of the tick depends

entirely upon the life history of the tick, which varies in the different localities; and it seems to them and to us that work on the life history of this creature can be taken up to better advantage by our Bureau than by the Bureau of Animal Industry.

The CHAIRMAN. Can you do much toward its experimentation until you ascertain its life history?

Mr. HOWARD. No. It depends entirely upon the periods of development of the insect in different stages. They have succeeded in eradicating the tick in several counties—12 counties in North Carolina and 7 in northwestern Georgia; along that line that encircles the foothills of the Appalachian chain of mountains.

The CHAIRMAN. What is the altitude there?

Mr. HOWARD. It ranges from 500 to 1,500 feet.

The CHAIRMAN. What is the altitude of Texas in the cattle country, down in the southern part of Texas?

Mr. HOWARD. Do you know what it is, Mr. Hunter?

Mr. W. D. HUNTER. It goes from nothing at the Gulf up to 2,500 feet.

Mr. BOWIE. Is the idea to do this work in your Bureau, or in the Bureau of Animal Industry?

Mr. HOWARD. The life history in our Bureau, and the application of it in the Bureau of Animal Industry.

Mr. BOWIE. I noticed the estimate for the increase of the appropriation was under the Bureau of Animal Industry.

Mr. HOWARD. That is true. But this little increase that I have asked, is \$10,000 for life history of the cattle tick in the South.

Mr. BOWIE. What do you ask for altogether?

Mr. HOWARD. It appears here.

The CHAIRMAN. You ask for about fifty thousand dollars, in round numbers.

Mr. BOWIE. You spoke of applying \$10,000 of that to the study of this tick question.

Mr. HOWARD. Yes; in case we get it.

Mr. BOWIE. I mean that is what you had in mind?

Mr. HOWARD. Yes.

Mr. BOWIE. And you recommend that?

Mr. HOWARD. Yes.

The CHAIRMAN. What have you done, Doctor, along the line of insects in relation to diseases of men?

Mr. HOWARD. We have done a great deal of work in regard to mosquitoes and their relation to malaria and yellow fever, and also in regard to flies and their relation to typhoid fever. While those are not directly agricultural questions, they are extremely interesting questions to the agricultural population. The eradication of yellow fever in New Orleans and the South generally last summer was very much aided by the investigations of our Bureau as to the life history of mosquitoes. The northern quarantine line was based entirely upon the investigations we had made on the distribution of the yellow fever mosquito. There is no doubt in the world but that the average physical condition of the agricultural population, especially in the South, is tremendously lowered by the prevalence of malaria. There is much that can yet be found out about the malarial mosquito, and we can do it.

Mr. LAMB. I thought the doctors were doing that.

Mr. HOWARD. The work of the Public Health and Marine-Hospital Service is entirely quarantine work, the stamping out of epidemics; but they have made no investigations as to the places where these things breed, and of the means of destroying them, and as to their life history, and so on.

Mr. BOWIE. Is it your theory that by locating what I might call the habitat of the original malarial germ you can destroy it and thereby in large part reduce the extent of malarial fevers?

Mr. HOWARD. Undoubtedly. Malaria can be absolutely eradicated from a given region by ascertaining the breeding places of the mosquitoes and destroying them.

Mr. BOWIE. What method do you propose to use in destroying them, the drainage of swamps, and things like that?

Mr. HOWARD. The drainage of swamps and the use of kerosene on stagnant pools.

Mr. LAMB. Do you kill the mosquito?

Mr. HOWARD. Yes.

Mr. HAUGEN. All of them, or a considerable part of them?

Mr. HOWARD. Yes; you can get rid of mosquitoes.

Mr. COCKS. Is not that done on the northern shore of Long Island?

Mr. HOWARD. Yes. In regard to malaria, a great deal has been done by the British Government in Africa, at places like Lagos, where they have absolutely eradicated the coast fever. That has been absolutely eradicated by careful, scientific, and practical work upon the mosquito question.

Mr. HAUGEN. How are they eradicated here? How do you destroy them?

Mr. HOWARD. It depends upon individual conditions of each locality. Drainage is one of the important methods. If there is no drainage, then you have to introduce fish into fishless pools.

Mr. HAUGEN. Do you use kerosene?

Mr. HOWARD. Yes.

Mr. LEVER. Is that an expensive remedy?

Mr. HOWARD. No; it is very cheap.

The CHAIRMAN. What other parasites besides the tick have you investigated?

Mr. HOWARD. We have been doing some work on the so-called Texas heelfly and the screw-worm fly, and have made investigations of lice affecting domestic animals—hog lice and chicken lice, and so on.

The CHAIRMAN. What is the heelfly?

Mr. HOWARD. It is an insect that lays its eggs on the heels of the cattle, and they lick them off and the larvæ go down and produce the warble—great knots with maggots in them. The maggots puncture the knots and come out.

Mr. FIELD. I have seen heelflies all my life, and have seen cattle running into the water to avoid them, and I always thought it was just a local pest.

Mr. HOWARD. In the Chicago live-stock market they estimate a loss of over \$3,000,000 from that cause alone.

The CHAIRMAN. I have heard of the heelfly, but I never heard of its doing that damage, Doctor.

Mr. FIELD. I understand they are much more common in rabbits.

Mr. HOWARD. That is a different species.

Mr. LAMB. They get fat and saucy.

The CHAIRMAN. Mr. Henry thought you referred to the common grub that gets under the hide of cattle in the spring.

Mr. HOWARD. That is the same thing.

The CHAIRMAN. I never knew there was any resemblance between the heel fly and the grub that comes out of the cattle's back in the spring. It is a sort of worm.

Mr. HOWARD. That is the larvæ of the heel fly.

The CHAIRMAN. I have seen it more in the case of cattle I have brought from Canada and Michigan than in other cattle that I have. I have seen as many as twenty-five of these grubs come out of a bullock's back. But that wound heals right over and the hide is perfect in a month or so; but for a few days in the spring, I should say in May or the middle of June, the hides are perforated by these grubs. They leave a perfectly healthy wound and it heals up.

Mr. HOWARD. But I understand the hide is not of as much value where the cattle have been affected in that way as when not.

The CHAIRMAN. I should say 99 per cent of the cattle all over the United States have those spring grubs, but I never knew before that there was any connection between them and the heel fly.

Mr. HOWARD. Yes; I will send you a little circular that we have published already on that subject.

The CHAIRMAN. What do you propose to do to drive him out?

Mr. HOWARD. We have not discovered anything at all yet.

Mr. FIELD. Is it necessarily conclusive that this grub is the larva of the heel fly?

Mr. HOWARD. Yes, sir.

The CHAIRMAN. How do you get to that, scientifically?

Mr. HOWARD. It has all been worked out. We have found the eggs and the fly that laid them on the heel of the cattle, and we have found the eggs in the mouth of the cattle, and we have found the larvæ in the throat of the cattle and in its digestive canal, and we have found them locating themselves just under the hide and making this bump.

The CHAIRMAN. That is, those grubs are always along the back. They are never on the side at all.

Mr. HOWARD. The location they take is just accidental. I have seen them in the sides down in the Southwest.

The CHAIRMAN. Have we that regular heel fly with us in the northern country.

Mr. HOWARD. Yes.

Mr. FIELD. Have you seen the cattle distressed by them?

The CHAIRMAN. No; but I have seen them flip their tails up in the spring and want to run.

Mr. HOWARD. The fly does not sting, but I think there must be some stinging or pricking sensation when they are coming out of the hides.

Mr. ADAMS. It does not add to his enjoyment much, I should say.

Mr. HOWARD. The cattle are afraid of that fly, although it can not sting them.

Mr. FIELD. They run to the water.

The CHAIRMAN. Are there any other parasites of animals of which you have made investigations?

Mr. HOWARD. We have studied the horn fly, but that has passed away, and it is not a serious matter now.

The CHAIRMAN. He is about as prevalent as he ever was. He is all

through the cattle country, but I do not believe there is any remedy for him. Upon the arrival of cold weather he disappears. These flies are very susceptible to cold, and the minute you have a frost they are gone. They do not seem to sting the animal.

Mr. HOWARD. They draw the blood. It is a biting fly.

Mr. FIELD. They mass themselves at places where the cattle can not reach them.

Mr. HAUGEN. What are you doing in the way of spraying orchards for eradicating the San Jose scale?

Mr. HOWARD. We are not eradicating the scale, but we are investigating new remedies.

Mr. HAUGEN. I understand this committee has a resolution referred to it appropriating money to carry on this work in certain parts of the country—in the Mississippi Valley. Have you considered that?

Mr. HOWARD. No, sir; I did not know of it.

Mr. HAUGEN. A member spoke to me about that resolution.

The CHAIRMAN. Then we will pass to the next clause:

Miscellaneous insect investigations, including the introduction of beneficial insects, quarantine work, and the study of fungus and other diseases of insects.

Mr. HOWARD. There are things that come up all the time, Mr. Chairman, that demand immediate investigation. During the last fiscal year under that head we had a number of things that came up. We have had to do a great deal of inspection work on nursery stock and other plants. We have to inspect everything that comes in under the Bureau of Plant Industry from abroad, as we are especially anxious not to introduce any new injurious insects, and by means of that inspection we have got, right at the beginning, three or four species of insects that would have been very injurious to this country, and we have succeeded by fumigating in preventing their being sent out in a living condition.

Then this last year our attention was called to the tobacco thrips in Florida producing damage, and producing what was called white veins. We sent a man down there immediately, and he hit upon a remedy, and has liberated the growers of choice tobacco from the danger of this disease.

The CHAIRMAN. What was the remedy?

Mr. HOWARD. It was spraying with kerosene emulsion. We also discovered the insect from which this trouble comes. We have cut down the weeds upon which the insect lived, and that, with the spray, has resulted in his destruction.

Then we have experimented in Louisiana with the sugar-cane beetle. We have found its life history in the past year, and have hit upon methods of control of a cultural nature in connection with the culture of the crop.

Then we have studied the weevils that affect the chinquapin and the filbert and the pecan nut.

We sent a man to the West, also, to study grasshopper conditions.

Mr. ADAMS. What is this insect that is destroying so many maple trees in the Western States, particularly in Wisconsin—the cotton scale?

Mr. HOWARD. I guess that is it—the cotton scale. That is an insect that will not be injurious more than two years in succession. It has a native parasite that wipes it out every two years also.

The CHAIRMAN. Does the tree die from the effect of it?

Mr. HOWARD. Eventually.

Mr. BROOKS. A good proportion of them recover.

Mr. HOWARD. Yes; it is only the young and unhealthy trees that do not recover. Have you seen any instances of vigorous trees destroyed?

Mr. ADAMS. Yes; I have seen some very fine trees destroyed.

Mr. HOWARD. There is a remedy for that. It is rather expensive. It is spraying at certain times in the year, mainly with kerosene. It must be applied, however, at a certain time. The lice hatch with you in Wisconsin probably about the 1st of June, and it is not worth while, probably, to spray after this thing has hatched out more than two or three weeks and become settled.

Mr. BROOKS. Is there not a simpler remedy than that? I have seen an ordinary garden hose directed against the tree and it washes them out in half an hour.

The CHAIRMAN. With a garden hose?

Mr. BROOKS. Yes; with a garden hose with a small nozzle. It will wash them off in a few minutes. I have done it with my own trees. I have had a man put on a rubber overcoat and go up in a tree and apply the hose.

Mr. HOWARD. It will also do with rose bushes. Those little slugs that get on the rose leaves can be washed off that way.

The CHAIRMAN. What beneficial insect have you introduced in the last year?

Mr. HOWARD. The work has been entirely on the parasites of the gypsy moth and the brown-tail moth. You gave us an appropriation last year of \$2,500 for that purpose, and I went abroad last spring and organized a corps of correspondents there, and got all the official entomologists in Germany and Italy and France to cooperate with us; and they sent us over last summer some thousands of specimens of the gypsy moth and the brown-tail moth. Over there the normal percentage of parasitism is from 60 to 70 per cent. These caterpillars were affected by several species of parasites. The parasites are now in hibernating quarters near Boston.

I have brought over 100,000 wintering nests of the brown-tail moth from Europe. A certain percentage of those will probably be affected with parasites. We will separate the different kinds, the primary parasite from the secondary, and destroy the secondary and liberate the primary. The work of the summer has been such that it has been shown to be a comparatively easy and inexpensive matter to import alive from Europe the parasites of those two species, and I do not see how it should not bring about a condition in Massachusetts, as it has in Europe, where the insects are by no means an annual menace to forest and to fruit trees.

Mr. BOWIE. Do you know as to the amount of money that Massachusetts spends out of its own treasury in that way?

Mr. HOWARD. From 1890 to 1900 Massachusetts spent about a million dollars. But then the appropriation ceased, and they appropriated no money for a time, until the last session of their legislature.

Mr. LAMB. That is because the bugs got away?

Mr. HOWARD. No; they were reducing it and getting it to a point where they could control it. There was a great deal of talk in the legislature about its getting away, and some members were accused of

spreading it in order to keep their jobs, and on that ground the appropriation was stopped.

Mr. BOWIE. What was the last appropriation?

Mr. HOWARD. The last appropriation, for 1899 and 1900, was \$175,000.

Mr. BOWIE. I thought you said they stopped last session?

Mr. HOWARD. Last session they made an appropriation of \$300,000, to be expended in three years; \$75,000 the first year, \$50,000 the second year, and \$75,000 the third year. Then they made an additional appropriation of \$30,000 to be expended in three years, \$10,000 in each year, for the purpose of introducing the parasites. They turned half of that money over to me and asked me to take charge of the foreign end of it for them. It is for the reason that the State of Massachusetts has contributed this money for this foreign work that we have not asked for money from Congress for the coming year for this purpose.

The CHAIRMAN. Some of the Massachusetts members have facetiously remarked that the insect will remain as long as the appropriation continues.

Mr. LAMB. A gentleman told me that this bug business ought to be stopped; that they just turned the bugs loose all over Massachusetts.

The CHAIRMAN. What have you been doing, Doctor, along the lines of quarantine work?

Mr. HOWARD. Simply the inspection work, Mr. Chairman. I have explained about that already. We have been asked to inspect certain things to see that they were free of insect pests.

The CHAIRMAN. Chiefly for the Bureau of Plant Industry?

Mr. HOWARD. Yes; and also for the Virginia and Maryland people.

The CHAIRMAN. Now, what have you done in regard to apiculture?

Mr. HOWARD. We have been importing some bees in the past year. Some bees have promised very good results. They have got over the Caucasian bee, that is so mild that it scarcely stings at all.

The CHAIRMAN. Where are you breeding those bees?

Mr. HOWARD. Here and over in Arlington. We are also getting the help of bee raisers.

Mr. ADAMS. Are you anticipating the getting of a stingless bee?

Mr. HOWARD. Not stingless, but a mild-mannered bee. Mr. Benton, our apiculturist for some years, has been sent abroad on a mission to get foreign bees, and possibly the giant bee of India, which has a longer tongue than other bees, which enables it to extract the honey from certain flowers more effectively than other bees, and it is a greater producer of honey. There are now more than 400,000 bee keepers in the country, and not all of them are doing their work in the most scientific way. We think that by experiments with new bee-forage plants and bee diseases we can improve the conditions. We are making experimental investigations with regard to bee diseases up in the State of New York, where we find a disease known as black brood.

The CHAIRMAN. You have not succeeded yet in crossing the bee with the lightning bug, so that the bee could work at night?

Mr. HOWARD. No, sir.

The CHAIRMAN. That was the first question that Mr. Hepburn, of Iowa, asked me when I had this bill on the floor for the first time. The House did not know whether he was joking or not.

Mr. HOWARD. That was the first time it was suggested?

The CHAIRMAN. I don't know. It was the first question that was asked me when I had the bill in charge on the floor. The House for a minute took it seriously, and it was very funny. I told him that was not a question of appropriation.

Now, as to silk culture, Doctor.

Mr. HOWARD. We are doing the same work we have done for the last three or four years. If we are going to have silk culture here, it is to be a matter of slow accomplishment. We must work in our Department at least ten years before we can expect much in the way of results, to get the proper number of mulberry trees started, and to get the proper number of people educated in the work. Just as in previous years, we have been buying about 130 ounces of eggs from abroad, and have been distributing them to all applicants who can show us that they have mulberry trees which they can feed to the worms. We buy the cocoons at the end of the year at the European market rate, and reel them into silk. We have made no effort to dispose of our silk produced until the present time. We have a large amount of waste products, and we have between two and three hundred pounds of very excellent reeled silk in the Department, and during this winter I am going to dispose of that in the open market.

Mr. LEVER. Is there any special interest on the part of the public in this silk culture?

Mr. HOWARD. I have received from four to five thousand letters from approximately that number of people, and I think it is fair to say that there were 2,000 people last year who were raising silk in that way.

Mr. BROOKS. Is there a good prospect of commercial success, in your judgment, in this country?

Mr. HOWARD. I am inclined to think there is. It is perfectly sure that we can not start a reeling establishment until we have an available supply of cocoons for it. Therefore, if we can get the supply after these somewhat artificial conditions that we are trying to bring about—

Mr. BROOKS. It employs essentially a cheap kind of labor, does it not?

Mr. HOWARD. Yes; but a recently invented reeling machine is going to cut the labor cost of reeling down by half. Colonies are being established—one at Mildmay, N. J.

Mr. BROOKS. Can they use children?

Mr. HOWARD. Yes. They use labor that is otherwise unemployed in households. The labor of women and children can be used in that way, to take care of the worms and look after them. That is done in Italy and France. The old people and the children do it.

Mr. LEVER. When do you send out the eggs and the mulberry cuttings?

Mr. HOWARD. We send out the eggs and mulberry cuttings at the close of the winter. They send in the cocoons in July. We had two French women to operate the reels, and they have taught the American girls, and the result is the work is all done now by American girls. Have you ever stopped in to see that work going on?

Mr. LEVER. No.

Mr. HOWARD. I would be glad if you would come in. It has long been held that this facility of reeling and the taste for this work must be inherited. Yet we have shown with these young Ameri-

can girls, put in there on those French reels and working one year under the instruction of these French operators, that they turn out just as good work as the French operators themselves. I sent some samples of the work to a silk mill, a big concern, in New York, and they said there was no difference in the quality whatever between the silk reeled by the French women and that reeled by the American girls.

The CHAIRMAN. Is there anything new in the line of insecticides?

Mr. HOWARD. No, sir. We are experimenting with hundreds and hundreds of different things. Mr. Hunter is experimenting with a great many things against the cotton-boll weevil.

The CHAIRMAN. You ask for \$50,000 additional, exclusive of what you ask for the cotton-boll weevil?

Mr. HOWARD. Yes.

The CHAIRMAN. How do you propose to divide that \$50,000?

Mr. HOWARD. In just this way: Add \$4,500 to the investigation of forest insects; \$2,800 to the investigation of deciduous fruit insects; \$3,700 to the investigation of insects affecting field crops; \$2,000 to bee-culture work; \$2,750 to silk-culture work; \$10,000 to cattle-tick life history investigation.

The CHAIRMAN. Ten thousand dollars to the cattle tick?

Mr. HOWARD. Yes. Five thousand dollars to the work on mosquitoes and other disease-bearing insects; \$5,000 for the investigation of insects injurious to tobacco and rice and other southern field products, exclusive of cotton; \$5,000 for insects affecting tropical fruits—oranges, pineapples, lemons, and so on.

I understand there is a bill introduced by Senator Taliaferro, of Florida, which has come, or will come, before your committee, asking for an appropriation of \$5,000 for the investigation of the white fly of the orange and lemon. That is an insect that is costing people down there a great deal. That comes under our general powers. We could investigate that under the head of all this class of insects in California and Florida and Louisiana.

Then we ask for an increase of \$5,000 for the investigation of insects affecting truck crops. That is a total increase of \$45,750.

[Memorandum on above, filed by Mr. Howard.]

Explanation of the desirability of the changes indicated in the estimates for the Bureau of Entomology.

1. The recommendation for an increase in the salary of the Chief of the Bureau is to place his salary on a par with the salaries paid to the Chiefs of the Bureaus of Statistics, Soils, Chemistry, Forestry, and Office of Experiment Stations.

2. The increase of the salary of the chief clerk is recommended for the reason that this man is overworked and handles the accounts and mails of the Bureau in addition to his other duties. This increase will place him on a par with the chief clerks of the Bureaus of Soils, Plant Industry, and Animal Industry.

3. Two additional clerks of class 1 and two additional clerks at \$1,000 each per annum are recommended for the reason that it has been found practically impossible for the present force to handle the clerical work of the Bureau. Much important work is delayed by this lack of a sufficient number of clerks, and when the season of annual leaves arrives, and at times when a majority of the field agents come to Washington to make out their reports, it has been found necessary to employ extra temporary clerks and stenographers. The increase in the clerical force recommended will, it is believed, enable all work to be kept promptly up to date.

4. One additional messenger at \$840 is recommended for the reason that the several offices of the Bureau are so widely separated that it is absolutely impossible for one messenger to attend to all of the messenger work. The Bureau occupies all or parts of four different buildings, while some of the employees have desk room in still a fifth building, ranging from the silk section, west of the main building, to the annex at No. 904 B street.

5. In the lump sum an increase of \$45,750 is recommended, and this for the reason that not only are important lines of work suffering from lack of funds, but certain new lines demand investigation and can not be undertaken without additional funds. On the basis of such an addition to the lump sum it is proposed to divide it in the following way:

Investigations of forest insects, in addition to the sum already allotted on the books of the Bureau, \$4,500. There exists at the present time a great demand for the sending of experts in forest insects to forest reserves, where disastrous mistakes have been made and are likely again to be made for lack of expert advice in this direction. The money value of this branch of the service is so great that an increase in its efficiency will be most profitable.

Deciduous fruit insect investigations, \$2,800, in addition to the amount already allotted on the books of the Bureau. The work undertaken during the past year in this direction has shown the value of the investigations and has indicated that with some additional funds much more satisfactory results could be obtained.

Investigations of insects affecting field crops, \$3,700, in addition to the amount already allotted on the books of the Bureau. Additional experts are needed for this branch of the work. The field experimentation, covering the whole of the wheat-growing area of the United States, shows so much diversity in separate regions that in order to get the best possible results, and particularly to carry on the important scheme of transferring parasites of the Hessian fly from one region to another, demands more money and more assistants.

Apicultural investigations, \$2,000, in addition to the sum already allotted on the books of the Bureau.

Silk culture, \$2,750, in addition to the funds allotted on the books of the Bureau. It is desired the coming year to purchase a newly invented silk reel, which reduces the cost of operating by about one-half. It is also desired to purchase and distribute larger quantities of eggs and to distribute a larger number of mulberry cuttings than has been done during the past two years.

Cattle-tick investigations, \$10,000. This work has just been taken up during the past season, and promises very important results if done on a large scale and in different parts of the Southern States. Upon a thorough investigation of the life history of the cattle tick over the whole of its geographic range in the United States will depend the efficacy of rotation of pasturage as a means of freeing sections of country from this carrier of Texas fever. Four or five experts could be employed to great advantage in carrying out this work.

Work on mosquitoes and other disease-bearing insects, \$5,000. Although activity in mosquito investigations has been very great during the past few years, there are still many important things to be learned regarding the distribution of the species carrying malaria and yellow fever. This work has a direct bearing on the health of the agricultural community, and its importance is evidenced by the fact that quarantine regulations of the Public Health and Marine-Hospital Service are based entirely upon studies of the geographic distribution of the yellow-fever mosquito made by the Chief of the Bureau.

Investigations of insects injurious to tobacco, sugar cane, and rice and other southern field crops, exclusive of cotton, \$5,000. A certain amount of work has been done during the past year upon certain sugar-cane and tobacco insects, and this work has indicated that there is a necessity for some extended investigations, which promise practical results.

Investigations of insects affecting tropical fruits—lemon, orange, pineapple, and so on—\$5,000. No careful studies have been made by the Bureau of the insects affecting this class of crops in Florida, Louisiana, Texas, and California for a number of years, and the subject demands further study and experimentation at this time.

Insects affecting truck crops, \$5,000. The work done by the Bureau against this class of insects during the past few years, while of great value to the truck farmer, has been done upon a very small scale, and large-scale field experimentation has been impossible on account of lack of funds. The assistant in charge of this work has been doing his work almost single handed, and sees opportunity

for the satisfactory and economical expenditure of even more money than the sum indicated.

The total of these sums mentioned above reaches \$45,750, the additional amount asked for under the head of general expenses, Bureau of Entomology.

Mr. BROOKS. Before I came in did you discuss the question of forest insects?

Mr. HOWARD. No; I was going to ask Doctor Hopkins to do that.

The CHAIRMAN. Now, we want to hear Doctor Hunter as to the cotton-boll weevil—at least, Doctor, a general account of things done by you in the cotton region.

STATEMENT OF MR. W. D. HUNTER, IN CHARGE OF THE COTTON-BOLL WEEVIL INVESTIGATION, BUREAU OF ENTOMOLOGY.

Mr. HUNTER. It would be a conservative estimate, indeed, to say that in the past ten years the cotton-boll weevil has caused a loss of 2,000,000 bales of cotton. The Bureau of Entomology has conducted studies almost from the beginning, of course on a small scale at first on account of small appropriations and the small territory which was invaded. But at the present time a great deal of study has been devoted to this insect.

As a result of our study we find that there is a great diversity in the weevil problem in different localities in Texas. That is evident in a great many ways. It is shown in land values, for instance. There are large tracts of land in Texas where land values have not gone down on account of the weevil at all, while in other localities where land sold for over \$50 an acre formerly, it can now be bought for \$25 an acre. Of course other economic factors enter into that, but the cotton-boll weevil is the most important.

It is positively known that the cotton-boll weevil problem is most serious where there is the greatest rainfall. In the counties in the western part of Texas where the rainfall is small, there has been practically no depreciation of land values, whereas on the other side of the State, toward the Sabine River, where the rainfall is greatest, we find the greatest depreciation in land values.

The way that works is simply this: As soon as the fruit of the cotton plant is punctured by the weevil it falls to the ground. Where there is an abundance of moisture the normal development of that insect in the fallen fruit can go ahead rapidly. Where there is a deficiency of moisture, when a few dry days intervene, that insect is prevented from maturing.

In Texas we have hit upon what is now known as the cultural remedy for the boll weevil. That remedy works best when the weather is dry. There is no uniformity in the successful application of the remedy at all. In some parts of the State it does not work as well as in others, and in certain years not as well as in other years. In wet years it worked much less effectively than in dry years. As a matter of fact, without that important factor of dryness in the growing season we can not assure the cotton planter that he is going to produce a profitable crop, even if he does follow our directions explicitly.

As soon as the weevil invades the Mississippi Valley it is in the midst of an entirely new set of conditions. Where the weevil is

invading the cotton belt now we have in an intensified form those peculiar conditions which in Texas have made the weevil problem more severe. We have in an intensified form those conditions that prevailed in Texas, where we have been compelled to tell the farmers that they had better get out of cotton raising as much as they can and devote their land to other crops, because there is no great certainty about the continuance of cotton production. Especially in Louisiana we find that the rainfall during the growing months—May, June, July, and August—is at least 25 per cent greater than in Texas.

A few days ago I was looking into the statistics for three typical points in the eastern part of the cotton belt—Vicksburg, Montgomery, Ala., and Atlanta, Ga.—and I found that for a period of four years, including and ending with the last year, the total annual precipitation was 46 inches for each one of these three cases. In Texas I selected a typical point, Fort Worth, and there the annual precipitation had been 26 inches. The increase at the three points named was an increase of 40 or 43 per cent over what it was at Fort Worth.

The CHAIRMAN. East of the Mississippi it was from 40 to 43 per cent more than it was at Fort Worth?

Mr. HUNTER. Yes.

Mr. BOWIE. When this weevil reaches Vicksburg, Montgomery, and Atlanta we will see the damage resulting from it will be relatively greater than it is in Texas?

Mr. HUNTER. Yes; and the system we have developed for combating the pest will be less effective. That is not at all theoretical. We have determined that in certain localities in Texas the system does not work on account of the moisture. That has become common knowledge in Texas and in Louisiana to a large extent. The Texas papers now frequently contain articles commenting in a spirit of elation on the prospect that now Texas is going to profit, while the rest of the country, which has been making money out of her misfortune, will suffer more severely than she did. I have knowledge of a number of cases where farmers who have holdings in Texas as well as in Mississippi and Alabama have disposed of their eastern holdings, but have no idea of giving up their holdings in Texas, because they find they can produce their crop more profitably.

Mr. BOWIE. Where the moisture is not so great?

Mr. HUNTER. Yes.

Mr. BOWIE. How far is the boll weevil from the Mississippi now?

Mr. HUNTER. It was 40 miles west of the Mississippi on the 1st of November last.

Mr. BOWIE. What is the average yearly advance?

Mr. HUNTER. Fifty miles.

Mr. BOWIE. Then it is due to cross the Mississippi next year?

Mr. HUNTER. By August next year.

Mr. BOWIE. Can it cross a stream of the size of the Mississippi?

Mr. HUNTER. There is no trouble about that at all. It has crossed a bayou 25 miles wide.

The CHAIRMAN. He has been transported across on bales of cotton, but he has not crossed it himself?

Mr. HUNTER. In the case of crossing a bayou 25 miles wide it was undoubtedly by flight.

The CHAIRMAN. By flight?

Mr. HUNTER. Yes, sir.

The CHAIRMAN. Why does it not travel more than 50 miles in a year when it can fly 25 miles without stopping?

Mr. HUNTER. They simply fly for food.

The CHAIRMAN. Has it plenty of food now?

Mr. HUNTER. They reproduce in such enormous numbers now in the cotton fields that by September or October next they will have fully populated those cotton fields and there will not be sufficient food for them there.

The CHAIRMAN. That means the total destruction of that field, does it not?

Mr. HUNTER. Yes; after a certain time, if they become so numerous that they are practically destroying the crop.

Mr. HOWARD. There is a good deal of cotton picked, though, in that time.

Mr. BOWIE. That method, as I understand, involves the planting of an early variety, so as to get it picked before great quantities of the weevil get there? They can have an early crop, but not a late crop?

Mr. HUNTER. Yes.

The CHAIRMAN. I suppose that the weevil was transported in baled cotton and otherwise?

Mr. HUNTER. If it did not get across the Mississippi by flying, perhaps there are a hundred ferries between New Orleans and Memphis that would give it access.

In that region east of the Mississippi we can perhaps take a hopeful view of the case. It is going to reproduce in such enormous quantities over there that it seems likely that parasites will take hold of it. It has not been apparent yet that parasites have been effective in taking hold of the weevil. We have used Mexican parasites, but they have not been effective. A part of that is due to the reduction of the number of weevils by the summer drought, but when that factor is eliminated it is likely that some of the diseases that work upon related weevils that are indigenous to that country will get away with the weevils.

Mr. BOWIE. You do not hope much from the Guatemalan ant, but from local parasites?

Mr. HUNTER. Yes.

The CHAIRMAN. To some parasite produced by more moisture?

Mr. HUNTER. Yes. There are many analogies in cases where an insect has reached only a certain distance and gained moderate numbers, and then gone beyond that and reached enormous numbers, and then a particular antidote or parasite has appeared and destroyed it.

The CHAIRMAN. Then, so far as you have gone, you are not prepared to say they will be able to raise cotton east of the Mississippi River notwithstanding the cotton boll weevil?

Mr. HUNTER. I will say it is very doubtful, based upon our present knowledge.

Mr. BOWIE. You simply have hopes?

Mr. HUNTER. I have hopes.

The CHAIRMAN. Based upon climatic conditions?

Mr. HUNTER. Yes.

Mr. LAMB. Does not nature develop a resistant plant?

Mr. HUNTER. It could be applied, but it would not be effective. In the early stages of the cotton the weevil feeds upon the leaves, but later they feed upon the fruit and can not be reached by Paris green at that stage.

Mr. FIELD. Have you ever made any test of these various suction devices by which you take up the falling squares of the embryo?

Mr. HUNTER. Yes. The State of Texas and the State of Louisiana have taken it up.

Mr. FIELD. We have a standing commission for all this, and they have rejected it repeatedly. The year before last the State of Texas spent \$60,000 for Paris green alone.

The CHAIRMAN. Now, about this suction process.

Mr. HUNTER. The idea occurred to me soon after I went to Texas in boll-weevil work in 1901. The weevil, as you probably all know, causes the cotton fruit to fall to the ground. If it were possible to pick up those by a suction machine or in some other way the increase of the weevil could be cut off. I began to look after that matter, and I wrote to the Patent Office to find out if any patent had been issued on things of that sort. I found that Mr. B. F. Johnson, who, by the way, is president of the Texas Cotton Ginners' Association, had patented it several years before. But he was in such circumstances that he could not have the castings made for a complete test of his machine. I employed him as a laborer for several months to go to the foundry at San Antonio and have the castings made.

We tried the machine in 1901. At first it was mechanically so imperfect that the use of that particular machine was out of the question. No arrangement was made in connection with it to keep this suction device at an even or uniform distance from the ground. With the motion of the mules it was jumped up and down, and thus escaped as many of the squares as it would pick up. Since that time, however, it has been taken up on an extensive scale by Parlin & Orindorff, at Dallas, Tex. One of those machines is located at Calvert, Tex., and others are located at other places in Texas; but in spite of the fact that they have a very powerful fan to take up these infested squares, it was found that the amount of debris and grass and sticks taken up would soon clog it, and that it would never work practically.

Mr. FIELD. You know that the picking of the squares from the ground would be a remedy?

Mr. HUNTER. Yes.

The CHAIRMAN. Are these squares right on the ground?

Mr. HUNTER. Yes.

The CHAIRMAN. Would it not be like street-sweeping work?

Mr. HUNTER. It would be more difficult than street sweeping.

The CHAIRMAN. Of course the ground would be more uneven. The general idea is to improve the conditions and raise crops profitably.

Mr. HUNTER. Yes. We are more hopeful on the line of getting a special kind of cultivator that will bury these squares in a certain amount of earth. That works both ways, however. Sometimes it aids in the development of the weevil, and sometimes again it hinders its development. When it is very dry, covering them with a light mulch of sand will prevent them from coming out. Sometimes they will come out nevertheless.

The plan was to do away with the cultivation of cotton on a certain strip along the border of the State in the hope that the weevil would not fly over. By September, however, we found that the weevils had flown clear over our heads, and the result of the whole business was a proof of the absolute futility of trying to stop the weevil even under the most favorable circumstances. Right there was the strategic point. If it could be stopped by such means anywhere in this country, that was the place to do it.

In addition to those definite things that have been demonstrated, of course we have tested a very large number of remedies which have been proposed from time to time. There is a tremendous activity on the part of people in various parts of the world in suggesting remedies. We have a group of correspondents in Liverpool and many elsewhere in England, because they are indirectly interested in the production of American cotton—

Mr. BOWIE. Directly interested—

Mr. HUNTER. I mean by saying "indirectly" that they are not producers, though they are large consumers. Of course, when these remedies or proposed remedies come to us we think they should be tested for two reasons: One reason is that if they are not any good, if there is nothing in them, the people want to know it, and thus be prevented from spending money on them; and another reason is that we do not know but that a man will come in some time with a very good idea. We can tell only by trying those things. We have tried so many that the new ones that come to us now are rather infrequent. But when a new one does come to us we put it under examination and try it.

The CHAIRMAN. Are most of these remedies in the form of sprays?

Mr. HUNTER. It is hard to classify them. A great many of them are intended to be put in the ground in the hope that the plant will take up some toxic property and carry it to the leaves and thus transmit it to the insect. Then another group of suggestions are for electrical devices, so as to regulate a current of electricity in such a way as to kill the insect and not affect the plant. Those are samples.

Mr. FIELD. Did you ever test carefully this remedy proposed by the Louisiana man with such confidence—

Mr. HUNTER. Captain Marston?

Mr. FIELD. Yes.

Mr. HUNTER. Yes; we tested it to the extent of using about a thousand pounds of Paris green last year on 15 or 18 acres in different places. We repeated those experiments and published a bulletin last fall, giving the results at that time.

The case that Captain Field brings up is a good one in showing the utility of that kind of work. Here was a practical cotton farmer, universally respected by his neighbors, who thought he had a good idea, a good method, of fighting the boll weevil with Paris green. He went to Texas and proclaimed his theory, and various people in various places began to buy Paris green. By placing a little Paris green on the plant early in the season a great number of the insects can be destroyed. But the fallacy of his method was that all the weevils were not then out from their hibernating quarters and would come out later.

The CHAIRMAN. It could not be applied later?

history of this country, some 13,000,000 bales. But in connection with that you have to consider the increase of the acreage and different climatic conditions.

Mr. BOWIE. But it covered more territory in 1905 than in 1904.

Mr. HUNTER. Yes; there was a drought in July and August, and that would tend to obscure the general seriousness of the weevil problem.

Mr. BOWIE. I notice in 1900 and about that time the largest crop in Texas was raised; something in the neighborhood of three and one-half million bales, was it not?

Mr. HUNTER. I think so.

Mr. FIELD. That included the Indian Territory.

Mr. BOWIE. Yes; that included two or three hundred thousand bales in the Indian Territory. This year the highest estimate reached about 2,300,000 for Texas proper.

Mr. FIELD. About that.

Mr. BOWIE. There is a loss in five years of seven or eight hundred thousand bales of cotton. Meantime Texas has been growing in population, unquestionably.

Mr. HUNTER. Yes.

Mr. BOWIE. Do you attribute the major part of that loss in the yield of Texas, from 1900 to 1905, to the operations of the boll weevil?

Mr. HUNTER. Almost entirely. You will find that almost everyone in Texas will agree with you on that proposition.

Mr. BOWIE. How does the acreage of 1905 compare with that of 1900, which was the record crop?

Mr. HUNTER. I should make, as a rough-and-ready statement, that it was 20 per cent greater.

Mr. BOWIE. In 1905?

Mr. HUNTER. Yes.

Mr. BOWIE. On account of the increase of population?

Mr. HUNTER. Yes; and the parts where it has increased are those dry parts that are not affected by the weevil.

Mr. FIELD. But, Doctor, you must make allowance that in that section affected by the boll weevil the acreage was considerably reduced, while the increase was confined to that part that was exempted.

Mr. HUNTER. Yes.

Mr. BOWIE. But the reduction of the acreage in the worst part of the boll-infected region was due to the infection.

Mr. FIELD. The increased acreage was toward the west, where they were exempted from it.

Mr. BOWIE. But even with all that, you are seven or eight hundred thousand bales still short of what you were before.

Mr. FIELD. Yes; they have cut down the acreage in the boll-weevil section—

The CHAIRMAN. Due not only to the boll weevil directly, but indirectly to the fear of it?

Mr. FIELD. Yes; but largely to its destructiveness.

Mr. BOWIE. That was the best cotton section you had?

Mr. FIELD. Yes.

Mr. BOWIE. But even your acreage now is not as good, and it is injured by the boll weevil?

Mr. FIELD. Yes; but when you get to the Panhandle region they do not seem to do so much damage.

Mr. HUNTER. They are just getting into that region.

The CHAIRMAN. Now, proceed, Doctor, along the line of the definite things you have ascertained.

Mr. HUNTER. We have given accurate information regarding the advance of the boll weevil from time to time. In cooperation with the Weather Bureau, we have issued monthly maps showing the territory that has been invaded. It seems to me that that covers the general ground.

Of course, many of our results have been negative. Our positive results are summed up in the perfection of the cultural system that means mitigating damage in the demonstration of the futility of attempting to stop the weevil, and in the general information we have been giving to the cotton trade about the general advance of the weevil and the amount of damage done. I think that covers the ground.

Doctor Howard suggests laying stress upon the point that it may be impossible to get rid of the weevil, but the only remedial work against the weevil is the destruction of the cotton fruit in the fall. After a certain time in the history of a cotton field, the remaining fruit serves only to breed more weevils to go through the winter. We have demonstrated that it is possible to reduce the number of weevils materially, and we have demonstrated on a very large scale in many cases that that actual destruction of the plant, preventing the fall brood, has a direct effect on the number of weevils in the field the following year.

Mr. LEVER. At what stage of the growth of this cotton does the weevil begin to make its attack—at the beginning?

Mr. HUNTER. It begins about the time that the cotton plant breaks through the ground, and it begins then to feed upon the leaves.

Mr. LEVER. In the early stages of the growth you could very likely control the growth of the weevil by the use of Paris green?

Mr. HUNTER. Yes, sir.

Mr. LEVER. But you can not after the squares begin to form?

Mr. HUNTER. No, sir. The worst of it is that when the cotton is small and the weevil is feeding upon the leaves, a very small proportion of the weevil population is there. The great bulk of them do not come out until after the cotton begins to put on its squares, and at that time they are entirely out of reach of poison.

The CHAIRMAN. Having ascertained those things definitely, how is it that you are going to need as much money another year as you do this? Those problems are eliminated now.

Mr. HUNTER. As a matter of fact, larger problems are opening up.

The CHAIRMAN. What are they?

Mr. HUNTER. The way the weevil is going to affect the cotton production in these moist climates in which it is just beginning.

The CHAIRMAN. Have you not absolutely proved that already, that they are more destructive in a moist climate? That is ascertained definitely, is it not?

Mr. HUNTER. Yes, sir. That simply demonstrates the necessity of some additional work, because all that we can do now is to follow this system which is effective and is based upon natural dryness in certain sections. Without that dryness this system is not going to work.

The CHAIRMAN. You mean the culture system?

Mr. HUNTER. Yes, sir; the culture system.

The CHAIRMAN. Will not that work to a certain extent east of the Mississippi?

Mr. HUNTER. Yes; to a certain extent; but the experience in Texas has shown that it is not going to work to a reliable extent.

The CHAIRMAN. How are you going to use this money? As I said before, having ascertained these facts, what are you going to do, exactly?

Mr. HUNTER. We will have to establish experimental fields in Louisiana and in Mississippi as soon as the weevil gets over there. We will study the progress of the weevil from the very beginning. We will keep a record of those experimental fields, of exactly the amount of damage it is doing. We will have a census of the weevil conditions there, so that when this record we keep suggests anything can be done toward mitigating the damage we will take those steps right there. Those conditions we can not foresee. As a matter of fact, we will be groping in the dark to a very great extent.

The CHAIRMAN. Was all the appropriation of last year expended?

Mr. HUNTER. The authorizations running to the end of the fiscal year will practically use up the amount of the appropriation. There will continue to be this demand for information from the cotton trade and other sources, and it will require a number of men to find out how far the weevil has gone. It is just as important to know that the weevil has not gone to certain quarters as it is to know that it has gone to others. Throughout the cotton fields reports are appearing in all the commercial journals that they have discovered the weevil—for instance, in Georgia.

At least a dozen reports originated like that last year. It is absolutely necessary that we should have men to send to look into those rumors. There is no telling when the weevil may be introduced accidentally, or perhaps intentionally, in the eastern part of the belt. It might be carried over there by a bale of cotton, clinging to the bagging of the bale; and an infested bale of that kind might be opened in a cotton mill where there were fields of cotton adjoining, and the weevils fly out and infest those fields. When anything of that kind happens we want to have money and resources and men to go to that locality and see what can be done toward exterminating the pest. In view of the general slow spread of the weevil, as indicated by the comparatively slow advance in the United States, it seems possible to exterminate and stamp out isolated colonies of that sort through the South.

The CHAIRMAN. Why would it not be a good policy to set aside a certain part of this appropriation to be used for emergencies of that kind?

Mr. HUNTER. I do not think we would object to that.

Mr. LEVER. Is not this an emergency appropriation?

The CHAIRMAN. That is so, but if you set aside a certain part of it for use in emergencies in the old cotton fields of Georgia and Mississippi might there be money enough to go there and stamp it out?

Mr. LEVER. Does the weevil travel eastward?

The CHAIRMAN. It follows the cotton plant.

Mr. HUNTER. Yes, sir; it follows the cotton plant.

Mr. LEVER. I got an idea somehow that it travels in an eastern direction. When was it discovered first to be in the United States?

Mr. HUNTER. It crossed the Rio Grande in 1892.

Mr. LEVER. How long has it been known?

Mr. HUNTER. For about sixty years.

Mr. LEVER. If it travels as fast as it appears to be going now and has been coming all that time I should think it would have gotten a good deal farther by this time than it is.

Mr. HUNTER. There are immense desert areas that it could not cross, because of the noncultivation of the crop.

Mr. LEVER. How did it get in?

Mr. HUNTER. Cotton culture was undertaken in small, isolated valleys through this region, which gave the weevil stepping stones, so to speak, and it got to the Rio Grande that way, and was carried across in all probability in unginned cotton, and from there it had practically a continuous advance.

There is this much to be said about the necessity for the continuation of experiments in Texas. We have been working with the boll weevil, an insect new to this country, which is getting in touch with local conditions, which is changing its habits. Its habits, as a matter of fact, have not reached, so to speak, a tangible stability as yet. The climatic problems give the matter an entirely different aspect in different parts of Texas, and the result of that is that very little can be stated about the experimental field work that is not carried on through a series of years. Of course that is true in all experiments. We can not draw conclusions from one year's work as to rainfall or many other features. The other conditions may make it absolutely impossible to draw correct conclusions. With this boll weevil now changing its habits the matter is further complicated. There is no telling what new information will come out. If we should stop right now and publish a system of controlling the boll weevil, this change of its habits going on, within five years from now that might be basically and fundamentally wrong.

The CHAIRMAN. With an emergency appropriation, if you were advised that the weevil had made its appearance on a certain plantation in Mississippi, do you suppose you could go there with a force of men and stamp him out, just as we stamped out the foot-and-mouth disease of cattle?

Mr. HUNTER. Yes, sir. Of course we would do it in connection with the State authorities.

The CHAIRMAN. Yes.

Mr. HUNTER. I think it would be possible.

The CHAIRMAN. You would not be sure of your results, would you?

Mr. HUNTER. I would be sure. We know of one positive instance in which the weevil was exterminated in a small way. Three years ago it got into a small experimental field in Audubon Park, New Orleans, right at the station, and the State authorities, under Mr. Morgan's direction, took charge of that and rooted up the cotton. They first picked off all the weevils they could find and the infested fruit. This was a small farm of about 12 acres, and the infection was confined to one corner of that, probably 2 or 3 acres. They uprooted the plants and burned them and plowed the land deeply. They happened to be able to flood it, and they did that as an additional precaution. That was three years ago, and cotton was planted there last year and this year also and no weevils appeared there.

The CHAIRMAN. From your knowledge of the insect, when it advances does it advance like a skirmish line or in little groups?

Mr. HUNTER. Its advance might be compared to the overflow of water.

The CHAIRMAN. Like a skirmish line?

Mr. HUNTER. Yes.

Mr. FIELD. Have you ever seen these weevils flying?

Mr. HUNTER. Yes, sir; I have had them light on my coat and hat frequently in walking through the cotton field; and we have carried on a large list of experiments to find out how far these weevils did fly. The insect is so small that it is impossible to see them very far. They fly to a very great extent, though.

The CHAIRMAN. You have proved conclusively that they fly 25 miles without stopping, because they can not stop on the water?

Mr. HUNTER. We have, sir.

The CHAIRMAN. So I do not see how you are going to stop them.

Mr. HUNTER. We do not expect to stop them. We think that is demonstrated.

Mr. DAVIS. Do you think money would stop it?

Mr. HUNTER. No, sir; I do not think money would stop it.

Mr. DAVIS. Money will do almost anything.

Mr. HUNTER. At the same time I will say that the money that has been spent has enabled cotton production in Texas to keep up pretty well.

The CHAIRMAN. I wish you would be a little more definite as to just what you are going to do next year. We are not cotton men here, most of us, and we would like to know just exactly what you propose to do.

Mr. HUNTER. We have a field laboratory at Dallas, Tex., and it will be necessary to continue that laboratory and have a number of experimental farms where an accurate record can be kept of the progress of the weevil and the effect on the cotton crop, and all that. We will have to have these farms located in different parts of the country.

The CHAIRMAN. Do you not know the effect of the weevil on the cotton crop?

Mr. HUNTER. To a certain extent we do; but the effect is changing.

The CHAIRMAN. It is not necessary for you to study the percentage of loss, is it?

Mr. HUNTER. Yes, sir; it is.

The CHAIRMAN. It seems to me it is more for you to study the effect of the loss, is it not?

Mr. HUNTER. We have got to consider that. For one thing, there is no other agency for collecting the information as to the amount of damage.

The CHAIRMAN. Have you not, as far as Texas is concerned, come to conclusions as to what can be done there?

Mr. HUNTER. Yes, sir.

The CHAIRMAN. Why continue any further there? Why not come to the east of the Mississippi and prepare to fight it there?

Mr. HUNTER. As a matter of fact, the most important work will be carried on in the eastern part of the infested territory, or just beyond the infested territory; but much can be learned by a continuation of the study of the weevil where it has been for the longest period.

The CHAIRMAN. I thought you had said that you had concluded the study of its life habits?

Mr. HUNTER. Yes, sir; but the conclusion of all that work is that there is no stability about its life habits. It is changing.

The CHAIRMAN. You can not study the life habits of an animal in Mississippi as it is in Texas?

Mr. HUNTER. Well, only in this way: That if you study its life history in Texas we may find parasites there and diseases that have an effect on it, which can be introduced in Mississippi, and by having studied the conditions in Texas we can tell approximately how it is going to affect conditions in Mississippi.

Mr. CANDLER. How far is it now from Mississippi?

Mr. HUNTER. About 40 miles.

Mr. CANDLER. When do you calculate it will reach there?

Mr. HUNTER. By next August.

The CHAIRMAN. Are those border States—Mississippi and the other States—doing anything in the line of protecting themselves?

Mr. HUNTER. Louisiana has done something.

The CHAIRMAN. It is in Louisiana now, but I mean along the river are they doing anything—are they standing guard against it in any way?

Mr. DAVIS. Practically all the Southern States have boll weevil quarantines now. Those quarantine laws provide for the receiving of products shipped into their States from infested territory. The Mississippi authorities had a man stationed at Vicksburg to examine all products that came from Texas last year.

The CHAIRMAN. Was he an expert entomologist?

Mr. HUNTER. Yes, sir.

The CHAIRMAN. Would he examine the cotton bales?

Mr. HUNTER. He would go right into the cars. He would put in sometimes a half an hour in a single carload.

The CHAIRMAN. You think that would be possible—to detect it in that way?

Mr. HUNTER. Yes, sir.

The CHAIRMAN. It was not infallible?

Mr. HUNTER. Not at all. We do not know any infallible means of finding one weevil in a large cotton field, for instance, or in a large carload of cotton.

Mr. BOWIE. But you might find it if there was any quantity?

Mr. HUNTER. Yes, sir. One weevil in a cotton field is impossible to find; and when it begins to multiply it is only a question of how early you are going to discover the infestation.

Mr. BOWIE. It seems to me you have thrashed the matter out pretty well in Texas, and your work now should be in the line of provisions to retard its progress across the Mississippi River.

Mr. HUNTER. That has been demonstrated to be impossible. Whatever money is set aside for the work, according to tentative plans we have made, 60 per cent of it at least will be used in investigations outside of Texas.

Mr. BOWIE. The reason for your continuing the work in Texas is due to two things; one is that it is the largest cotton State, and the other in that the weevil has been there the longest, and probably is shifting, as I understand it, and it does not present the same problem each year that it did the previous year?

Mr. HUNTER. That is it.

Mr. BOWIE. There is something to learn.

Mr. HUNTER. Yes, sir; and we have experiments on certain blocks of land in Texas that have been carried on for several years, and it goes without saying that there is advantage in continuing work on those sites again.

Mr. CANDLER. You said that there is increased moisture in the area covered by Mississippi and Alabama?

Mr. HUNTER. Yes, sir.

Mr. CANDLER. And that it is more difficult to handle these problems where there is this increased moisture than it is in Texas?

Mr. HUNTER. Yes, sir.

Mr. CANDLER. Have you made any experiments looking forward to the solution of that difficulty when the weevil reaches Mississippi, as I should say it will next year?

Mr. HUNTER. We have had no very good opportunities to conduct experiments of that kind.

Mr. CANDLER. That is one of the places you expect to use a part of this appropriation if it becomes necessary?

Mr. HUNTER. Yes, sir.

Mr. CANDLER. And that would be probably included in the emergency amount suggested by the chairman a few minutes ago to be reserved?

Mr. HUNTER. The emergency exists right now.

The CHAIRMAN. I meant the actual finding of the insect in Georgia and Mississippi.

Mr. HUNTER. I did not understand the gentleman to bring out that point.

Mr. CANDLER. You think it is necessary that you should have this money in order to proceed immediately with these investigations whenever the occasion arises?

Mr. HUNTER. Yes, sir. The insect is almost to the Mississippi River now. It is in bayous that run back from the Mississippi at this time, and almost practically right on the Mississippi River.

Mr. CANDLER. Do you know whether Mississippi has made any provision looking to an emergency of that kind?

Mr. HUNTER. Mississippi has an appropriation of \$15,000—a biennial appropriation on the 1st of July, I believe.

Mr. CANDLER. I live in Mississippi myself, and if it is that close to us I want to write to them to prepare to meet it.

The CHAIRMAN. You ought to have an emergency appropriation so as to help, if a spot breaks out on a man's plantation, so that you can go right there and take hold of it and stamp it out.

Mr. BROOKS. Is there any chance of that thing dying out—dying a natural death—the weevil?

Mr. HUNTER. It has not shown any inclination to do that in Texas, where it has been for twelve years, and it has not shown any such inclination in parts of Mexico where we have known it to exist for twenty-five years.

Mr. BROOKS. It appears that there must have been a period of greater activity up here than it ever had in Mexico. It has been known there for seventy-five or one hundred years.

Mr. HUNTER. Hardly as long as that. In 1843 it was first de-

scribed scientifically; but from 1843 to 1871 there is not a word written about it.

Mr. BROOKS. Was it during that period operating in closely confined areas?

Mr. HUNTER. All we know about it is one record in a strictly technical scientific German publication describing the species, based upon three specimens found near Vera Cruz. That is all there is in entomological literature up to 1871.

The CHAIRMAN. Is there anything further?

Mr. HUNTER. I have nothing further, sir.

STATEMENT OF MR. A. D. HOPKINS, OF THE AGRICULTURAL DEPARTMENT, WASHINGTON, D. C.

Mr. HOPKINS. Mr. Chairman, I have summarized and condensed what I want to say to you, and have written it out. With your permission I will read it to you.

EXTENT OF DEPREDACTIONS.

Our explorations in the forested areas of different sections of the United States, together with detailed studies of the principal depredations by insects, have indicated that the aggregate losses of the natural forest resources and forest products from insects is equal to that from forest fires.

Our estimates of the average annual losses of standing timber during the past ten years, based on a low stumpage value, is between fifty and seventy million dollars, and that resulting from damage to the timber from the time the trees are felled until and after the manufactured products are utilized is between twenty-five and thirty million dollars.

We have also shown that with a detailed knowledge of the many hundreds of different kinds of insects which cause these losses, and of the methods of forest management, lumbering, manufacturing, and commercial distribution, which offer favorable or unfavorable conditions for their depredations, we can recommend practical and inexpensive methods of preventing losses.

OBJECTS OF INVESTIGATIONS.

Until recent years practically nothing was known about the forest insects of North America, and less of the methods of preventing losses from their depredations; therefore the primary object of this feature of the work of the Bureau of Entomology, introduced in 1902, has been to conduct original research in the forests to determine the principal insect enemies of forests and forest products, the character and extent of the depredations, and the more important facts in the life history of the destructive insects, local forest management, lumbering operations, beneficial insects, and other natural influences upon which to base conclusions and recommendations relating to practical methods of preventing losses.

METHODS.

Our methods of securing these desired facts have been extensive explorations by trained forest entomologists and a detailed study in the field of the principal insects and problems which, on account of the losses involved, demand special attention; cooperation with the forest service in the determination of proper methods of management, and the application of preventive measures; cooperation with individual owners of forests, and manufacturers of forest products, to determine methods of lumbering, storage, and transportation which would prevent losses.

RESULTS.

Some of the results so far attained are found in one of the largest and most comprehensive collections of forest insects in the world, a general knowledge of the insect enemies and friends of the forests of the United States, and a special knowledge of the principal enemies, all of which form the basis for prompt expert information on causes, effects, and remedies. Much of this information has been given in special bulletins of the Bureau and in articles in the Yearbook of the Department of Agriculture.

Some of the results which will serve as examples of the practical application of this information may be given as follows:

Oak and hemlock tanbarks are attacked by insects, which, at a single tannery in West Virginia, caused a loss of over \$50,000 worth of hemlock bark. A study of these insects revealed the fact that they never attack the bark until three years after it is removed from the trees; therefore, an adjustment of the business methods which will insure the utilization of the bark before it is three years old will prevent all losses.

Within the past century the spruce forests of northern New England have suffered enormous losses from the ravages of a bark beetle, which attacks the matured trees and breeds beneath the bark, where they remain until the next year before emerging to renew their attack. Our detailed investigations revealed the fact that if the regular logging operations were concentrated in the worst infested sections the numbers of the insects would be so reduced as to check the trouble. This was recommended and was adopted by one of the large lumbering concerns in Maine, with the result of preventing, according to the estimate of a member of the company, a loss of \$200,000. This was accomplished practically without cost.

The hickory trees of the eastern United States are being destroyed by a bark beetle which attacks the trees in June to September. The broods remain in the bark until the next June before emerging to renew their attack. This beetle had killed some 200 trees in Belle Isle Park, Detroit, and some hundreds more were found infested in May, 1903, when we were called to make an investigation. We recommended that these infested trees be cut and removed within two weeks to prevent the emerging of the broods. This was adopted, and the trees were given to a manufacturer of handles, who removed and utilized them within the specified time, thus, without cost to the city government, the infection was removed, and no more trees on the island have died.

The CHAIRMAN. We had it all through our country.

Mr. HOPKINS. It has been enormously destructive throughout the eastern United States.

The CHAIRMAN. It has destroyed almost all the hickory trees in our country; but now it has left us.

Mr. HOPKINS. Perhaps because it has killed nearly all the trees in that part.

The CHAIRMAN. That is pretty near true; but it has disappeared now and gone away and left a few of the hickory trees.

Mr. HOPKINS. Perhaps the most striking example of the destruction of forest trees by insects is that caused by the Black Hills beetle in the Black Hills Forest Reserve of South Dakota. Within five or six years this beetle has killed over 1,000,000,000 feet of pine timber, and is threatening the destruction of all merchantable timber of the reserve, and with it the mining and other dependent industries, representing an annual product of over \$10,000,000. Our investigations in 1901 showed that this insect could be controlled without cost to the Government.

It was shown that if the regular operations of cutting and barking the trees for mine timbers and railroad ties were concentrated on those trees which are actually infested with the broods of the destructive insects it would have the desired effect of killing the insects, and that if such operations were sufficiently extensive to utilize all or even 75 per cent of the infested trees during the period of nine months of the year in which the broods remain in the bark, it would bring the pest under complete control.

The CHAIRMAN. That is, take out the infested trees and leave the sound ones?

Mr. HOPKINS. Yes, sir; and leave those that are already dead and from which the insects have emerged.

For various reasons these recommendations were not adopted to a sufficient extent to control the insect, and its ravages have continued until at the present time it is almost beyond control. In addition to the methods which would have been effectual at first, it may now be necessary for the Government to expend fifteen to thirty thousand dollars in order to accomplish anything of definite value.

Mr. BROOKS. Is that the turpentine beetle?

Mr. HOPKINS. It is the Black Hills beetle.

Mr. BROOKS. Is it the turpentine beetle?

Mr. HOPKINS. This is the beetle that kills pine timber. The true turpentine beetle is a large red beetle that attacks the base of the trees and lives in the living bark and pitch.

Mr. BROOKS. That is the beetle we have all through the Rocky Mountains?

Mr. HOPKINS. Yes; the true turpentine beetle is common both in the western and eastern United States. You have it in Colorado.

Mr. BROOKS. You conducted some of those examinations in Colorado, did you not?

Mr. HOPKINS. Yes; in October, 1905.

Mr. BROOKS. You think that the same thing would meet the difficulty with us?

Mr. HOPKINS. Sure. It has been well tested at Colorado Springs by General Palmer, who I think in his work over there has possibly

prevented an outbreak like that in the Black Hills, by taking prompt action in cutting the infested trees.

Mr. BROOKS. He has done almost more there than the Government has.

Mr. HOPKINS. It is really most encouraging the way he is taking hold of the matter in following our recommendations.

Mr. BROOKS. I think you told me a while ago that many of those old forest fires, or supposed forest fires, where great areas of country had been devastated, were very likely not forest fires at all, but were marks of the depredations of this beetle.

Mr. HOPKINS. We have conclusive evidence that if a large amount of timber is killed, as in the Black Hills, by the beetles it encourages the starting of forest fires. These insect depredations are nothing new. That is the reason that we find all young trees in the eastern part of the United States. We do not find any trees in the eastern part of the United States that are over 500 years old. They should have been much older than that. This shows that the timber has been killed off by something. When forests are matured they are more liable to attack from destructive insects.

The CHAIRMAN. Referring back to that insect that destroys the hickory trees, there is no remedy discovered for that. You could not go into a hickory forest and do anything with it. You would have to cut down the whole forest.

Mr. HOPKINS. No, sir; you would not have to cut all of the trees. There are only a certain number of the trees infested each year, and the broods of the destructive insect remain in the timber six months. There are six months in which to utilize this timber and kill the insects. These insects can only kill the trees when they occur in enormous numbers. If their numbers are reduced 50 per cent, their natural enemies, parasites, overcome them. They must attack a tree in sufficient numbers to actually kill it. By reducing the numbers the parasites take care of the remainder. If people would read our bulletins and take a little concerted action, there would be no trouble to control it.

The CHAIRMAN. It is the same old question. It is the same old story of leading the horse to water, but you can not make him drink.

Mr. HOPKINS. The total expenditures for forest-insect investigations by the Department of Agriculture during the past seven years has not exceeded \$25,000, yet facts have already been determined and information given out in publications and through correspondence which, if promptly and properly applied, would prevent the loss of millions of dollars and contribute to the protection of forest resources, which will be of inestimable value in the near future.

There is urgent need for further practical and technical information, based on original research, and especial need for practical demonstrations and instructions which will enable the forester and practical man to apply this information intelligently, economically, and effectually.

We are getting at the facts about life histories. We have much to learn yet, but we do know a good deal about them. We have to explain to the lumberman that if he will cut his timber at a certain time he will not suffer losses from wood-boring insects, and he will not contribute to the number of insects that may kill the rest of the forest;

and in that line we hope to do some work, especially in forest reserves in the Rocky Mountain regions.

The CHAIRMAN. Is not forest entomology taught at all in these forest schools?

Mr. HOPKINS. I deliver a few lectures at the Yale school. There are so few people who have studied forest entomology in this country.

The CHAIRMAN. You take these well-established schools at Yale and Ann Arbor, and they certainly ought to teach it. Do you not think that ought to be done?

Mr. HOPKINS. Certainly, it ought.

The CHAIRMAN. I should think the two things are inseparable almost—forestry and forest entomology.

Mr. HOPKINS. The Forester can not do anything with insects unless he knows something about them.

Mr. HENRY. I understand you have given lectures at the Yale school, and some of those young men coming from there will have a knowledge of it.

Mr. HOPKINS. A superficial knowledge of forest insects is awfully dangerous. They think they know about a remedy for something, and they seek to apply it, but it often turns out to do more harm than good.

Mr. HASKINS. Several years ago some insect went through our part of the country and got in all our maple orchards and injured them terribly. It looked like a fire had been through there. Those insects have disappeared now.

Mr. HOPKINS. Did they eat the leaves off or bore into the trees?

Mr. HASKINS. They seemed to eat the leaves off.

The CHAIRMAN. Mr. Adams asked something about the maple trees in Wisconsin.

Mr. HOWARD. That was a different insect entirely.

Mr. HOPKINS. When it comes to those insects which defoliate the trees, the only method of fighting them is by introducing some natural enemy.

Mr. HASKINS. We know what the result of their work is, and now have you any antidote for it? That is what you should do—give us information so that we can exterminate this insect.

Mr. HOPKINS. We have been directing our work especially to the insects which bore in the wood and in the bark and kill the tree and also those that bore in the wood and destroy the value of the product. We can tell you how to deal with them, and frequently it will not cost anything to apply the remedy. It is simply necessary for the lumbermen to adjust their business methods so that the conditions may be rendered unfavorable for destructive insects to operate. Certain insects fly at a certain time of the year, and if the timber is cut at that time and the lumber is piled up the insects will bore that lumber full of holes. But if the cutting is put off for a little while until those insects quit flying it can then be done without any chance of loss.

Mr. DAVIS. Is it easily discoverable which trees are infested in a forest?

Mr. HOPKINS. In the case of pine and spruce it is, because the leaves turn yellow.

Mr. DAVIS. You speak about the lumbermen simply cutting trees that are infested.

Mr. HOPKINS. No, sir; they cut the perfectly healthy trees and cut them into saw logs. Then if they handle the logs in a certain way they contribute to the insects that attack trees after they are cut down and bore into the wood.

Mr. DAVIS. I understood you to say that they cut those trees that were infested with insects to prevent the spread of the infestation, and I wanted to know if those trees which are infested were easy to discover?

Mr. HOPKINS. Yes, sir. In the case of the Black Hills beetle, where the trees are being attacked, the bark is covered with small masses of pitch and later the leaves turn yellow or a reddish color.

Mr. DAVIS. Of course if they pick out simply the bad and leave the good—

Mr. HOPKINS. They always take the best, and after they have killed those they go on down to the others.

(Thereupon, at 1.30 o'clock, the committee adjourned until tomorrow, February 7, 1906, at 11 o'clock a. m.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Wednesday, February 7, 1906.

**STATEMENT OF MR. C. HART MERRIAM, CHIEF OF BUREAU OF
BIOLOGICAL SURVEY, DEPARTMENT OF AGRICULTURE.**

The committee met this day at 11 o'clock a. m., Hon. James W. Wadsworth in the chair.

The CHAIRMAN. Doctor, in looking over your items for the Bureau of Biological Survey, I see the second change submitted is an increase of one clerk of class 2. Why is that?

Mr. MERRIAM. That is for an additional stenographer.

The CHAIRMAN. Is it a promotion or an additional man?

Mr. MERRIAM. An additional person altogether. We are flat on our backs for a stenographer and typewriter. We have only one man for the two divisions of the Biological Survey to do all the work. Doctor Palmer, in the Game Preservation Division, has a separate stenographer.

The CHAIRMAN. Do you start in a typewriter at \$1,200?

Mr. MERRIAM. This is for a stenographer and typewriter. The amount of salary varies as to what kind of a stenographer he is. Sometimes we can get them at \$900, and sometimes at \$1,400.

The CHAIRMAN. This would make it obligatory upon you to pay \$1,200, would it not?

Mr. MERRIAM. It would; but we would want a \$1,200 man—a good man.

The CHAIRMAN. Is not that a good deal higher than is paid in private business for a stenographer and typewriter?

Mr. MERRIAM. We have had stenographers who, when they have become competent for their work, have invariably been taken away to higher positions in other Departments. That has happened again and again. As soon as a good man becomes really competent he is

taken away from us and paid a higher salary, either in the Secretary's Office or somewhere else, so that we have not been able to keep him.

The CHAIRMAN. Now, doctor, under your paragraphs you estimate "For biological investigations, including the geographic distribution and migrations of animals, birds, and plants, and for the promotion of economic ornithology and mammalogy." Take up that paragraph in your item and give us some account of the line of work you have done, what you are doing, what you expect to do under it. We want to take up the items by paragraphs.

Mr. MERRIAM. This paragraph covers several different kinds of work. The first covers geographical distribution. That is the work on the life zone, and in connection with that we are mapping the distribution of mammals and birds and plants. From a study of those separate maps we are preparing general maps of the United States. These maps here [indicating] show what I mean.

By mapping the distribution of individual kinds of animals and birds and trees and shrubs and making composites of those maps we obtain maps like this [indicating], which show that there are definite transcontinental belts in the country, each of which has different subdivisions, and each of these belts is inhabited by a large number of species of plants, animals, birds, reptiles, trees, and shrubs, and that they do not occur anywhere else but in those areas. We also find that these areas are coordinate with the natural areas of crop distribution, with varieties of fruits and grains adapted to those same belts; so that by this study of the native fauna and flora of natural life which we find in a country we lay out the boundaries of the crop zones, and then we publish lists of the varieties of crops adapted to those zones and subdivisions of zones.

The CHAIRMAN. Is that, in a measure, supplemental to the Soil Survey?

Mr. MERRIAM. Not at all. It is a totally different and broader piece of work. It is dependent upon climatic conditions—the life zone, by which the animal and plant life of the world is governed. The conditions governing them are primarily climatic, conditions of temperature and humidity. We are studying broad transcontinental belts and their chief subdivisions, irrespective of soil and minor conditions of that sort.

The CHAIRMAN. You said you could ascertain what crops would thrive in those belts and subdivisions?

Mr. MERRIAM. Yes.

The CHAIRMAN. Irrespective of the soil?

Mr. MERRIAM. They are governed to a certain extent by the soil within these minor areas, but we do not go into those details at all, because they are studied by the Soil Survey of the Department of Agriculture.

The CHAIRMAN. You claim that you prove that certain of these belts are fitted for certain crops, and you do not care about the soil. Your proof is conclusive to you that they are fitted for certain crops?

Mr. MERRIAM. Yes; we find what crops are adapted to those belts.

The CHAIRMAN. Without any analysis of the soil at all?

Mr. MERRIAM. Yes. If you are working with oranges, for instance, or apricots, or any other fruits in the place in which they thrive, you will find certain areas of unfit soil. We pay no attention to these.

They are purely local and minor. We are paying attention to the broad transcontinental conditions only.

Mr. FIELD. Whenever you find the presence of certain animals, birds, and plant life, then you always find associated with it certain crops adapted to that section?

Mr. MERRIAM. Yes; there are certain definite associations of crops, and we have already published in the Biological Survey lists of those crops in the entire country, with their adaptations.

The CHAIRMAN. How do you arrive at that result?

Mr. MERRIAM. Many years ago, when I first asked to be permitted to make a provisional experiment of a biological survey, I thought that theoretically, inasmuch as climate covers the distribution of life on earth (we have known that since Humbolt's time), it must cover the distribution of our species and the distribution of crops. We know that bananas will grow only in the Tropics and oranges and lemons in a subtropical temperature, and as you go north you get out of those crops and get into another set of crops. You leave the cotton and oranges and get into tobacco, and then you get into areas where only apples and cherries thrive, and then by-and-by, farther north, you find only the hardy Russian apples and cereals. And so it was concluded that the distribution of crops must be necessarily controlled by climatic conditions.

We wanted to find out whether boundaries of belts marking the native distribution of our fauna and flora were or were not the natural boundaries of the crop belts, and after ascertaining that they were, after work chiefly on horticultural lines, I secured the work of a cereal specialist, Professor Plumb, who knew nothing about my work, and I asked him to make a study of the distribution of the cereals in the United States. He platted his results on a map. Probably he was the most surprised man in the United States when I sent him our map, to find the same thing as appeared on his map. A vast quantity of cereals are adapted to a particular set of humidity and temperature conditions, and those conditions are the same as govern the different species of animals, birds, and plants.

When Professor Plumb platted those on his map they coincided exactly with our belts. The entomologists find that their insects coincide with the belts, and with the noxious species I find it is within the zones we indicate and nowhere else, so that they take copies of our maps and they follow the insects, and the insects, as they find, follow the ramifications of those zones, the same as trees and shrubs and mammals and birds do.

Some of the physicians who have been studying yellow fever have found that yellow fever was limited entirely by the same factors—that is, it was confined to the life zone.

It is the same with many cattle diseases in Texas. We have been making a detailed biological survey of Texas, and also one of California. The Texas work is just now published, and it is a fine piece of work. That is the first time they have had a life zone map of the State of Texas.

The CHAIRMAN. Please explain what that means.

Mr. MERRIAM. In the first place, this lower Sonoran area [indicating on map], which is adapted to the greatest number of agricultural crops, occupies the greater part of Texas, and extends over to the east

of the Staked Plains and up the valley of the Pecos, and up the Rio Grande and up to about Albuquerque, N. Mex. There is an arm running from the Canadian River here [indicating] up to the Pecos, and there is a continuous channel here, almost connecting those two great rivers.

Mr. LAMB. Where is that?

Mr. MERRIAM. That is the Staked Plains [indicating]. That is the Upper Sonoran [indicating], fitted for a different set of crops; and the area colored blue, called the Transition Zone, is fitted for crops requiring a cooler climate. The areas colored green, or the high mountains situated within the blue and light yellow belts, are not suited to agriculture at all. We call that the Boreal Zone.

We find, in addition to these temperate areas, that there is a marked line of demarcation between the humid and the arid parts of Texas. The eastern humid area which comes up from Florida, and which takes in the Gulf States, overlaps the Sabine River country and overlaps this dark area here [indicating].

Mr. FIELD. What stream is that there, the boundary line? Is it the Colorado or the Brazos?

Mr. MERRIAM. There is no stream that follows it far.

The CHAIRMAN. On what notion do you base that map?

Mr. MERRIAM. This is the more arid part. This is the line of the mesquite and cacti, and so on, and there the armadillo and a number of birds, and the osceola and a number of mammals live.

The CHAIRMAN. On what notion do you base that map?

Mr. MERRIAM. By work upon the ground. We do the main part of the mapping on the ground. We collect certain specimens of which we are not sure of the identity and bring them back here for absolute identification. The main part of the work was done upon horseback on the ground. I have brought here some field maps [producing same] to show how that was done. This [indicating] was done in Colorado by one of our men last year. He started in at Denver and went up to Boulder. He started here [indicating] and mapped the life zone as far as he went. That is the first piece of work we have done in northern Colorado. We have done other work in southern Colorado.

Here is what we have done in New Mexico [producing map]. Part of it was done in connection with Texas and part of it is really included in Texas. All the area remaining unmapped in New Mexico is shown in colors on this map [producing same]. Our principal field man, Mr. Bailey, was doing that work on the ground. I am doing personally similar work in California. There is a map [producing same] showing a species of pocket gophers of California, one of the greatest pests to agriculture in that State; a pest whose depredations in destroying trees has amounted in the aggregate to a million dollars. We have more than twenty species of pocket gophers in that State. It is a great work to get their habits and a knowledge of the means of combating them.

Those two [indicating maps] show the worst species of ground squirrels in California. One crosses the Sacramento River at Chico and the other begins here [indicating on map] and crosses the desert. Those are immensely destructive to agriculture.

Here are some field mice of California [producing map]. There is

one kind that inhabit only the moist country along the great rivers and then there are others that live in the mountains and in the higher areas.

This map [indicating] shows the distribution of a number of species of chipmunks. You see the parallel belts along the flanks of the Sierra and its foothills. This parallel shows the distribution of pines, the yellow pine marked in green and the other pine in brown.

This map [indicating] shows the distribution of giant rabbits. There is a zone map [exhibiting same], so far as I can get one by combining all the work done thus far—an agricultural map of southern California on a large scale. We are now trying to get the Geological Survey to finish for us a large map of California suitable to platting our results on it on a large scale.

Mr. HASKINS. What is the distinction between a ground squirrel and a chipmunk?

Mr. MERRIAM. A ground squirrel does not climb trees and has no stripes on his back, and they are somewhat clumsy animals. The chipmunk, on the other hand, has stripes and is much more active. The ground squirrels are among the most destructive animals we have in America. In the State of Washington in one county they estimate that the damage which they have done is half a million dollars, from ground squirrels in Whitman County alone.

The CHAIRMAN. They live in the ground?

Mr. MERRIAM. Yes; and they live on every crop they can get hold of.

Mr. FIELD. Have you ever learned where they get water?

Mr. MERRIAM. Most of the ground squirrels and the kangaroo rats and things of that kind in the arid belt do not drink at all. You will find a kangaroo rat, that never goes 500 feet in his life, several miles from any water; and the only moisture they get is from the seeds which they eat. This map [indicating] shows the area inhabited by the ground squirrels in the United States. Some of those areas here are uncolored. They are the mountain areas where species live that do not do harm.

Mr. LAMB. How much of the country does that map show?

Mr. MERRIAM. About three-fourths of the United States.

The CHAIRMAN. What does the blue show?

Mr. MERRIAM. The striped ground squirrel, an animal that lives on the prairies.

Mr. FIELD. What is the difference between that and the prairie dog?

Mr. MERRIAM. It is a smaller animal and more slender. It has 13 rows of stripes and spots down its back—

Mr. HENRY. Indicating the 13 original States, perhaps.

Mr. MERRIAM. I do not know. It runs from Texas north to Manitoba, and west of Michigan to the foot of the Rocky Mountains.

The CHAIRMAN. Do you find them in Michigan?

Mr. MERRIAM. One form of it. This shows [indicating map] the overlapping of these species. Here is where an entirely different species comes in, one nearly as big as the prairie dog, and it does great damage in Alberta, and in Manitoba, and in Saskatchewan, and Assiniboia.

Mr. LEVER. Do you furnish farmers with suggestions as to how to get rid of those animals?

Mr. MERRIAM. Yes; that is our principal business. We are doing that constantly.

The CHAIRMAN. As I stated yesterday, I hate to relate personal experiences, but we have destroyed the ground squirrels in Texas by poison. How to do it is very well known, but the trouble is that people will not do it. I can show you our ranch with dozens of ex-villages where we have driven them out.

Mr. MERRIAM. Are those prairie dogs or ground squirrels?

The CHAIRMAN. Prairie dogs. The Government could go on for a hundred years and teach those people how to do that, but they will not do it. Right alongside of us are neighbors who have lots of them, and they want the Government to do it for them.

Mr. MERRIAM. We try to tell them how, and show them the most economical and the latest methods and the best formulas for strychnine poisoning, for instance. Just now we are starting on a line of bacillus cultures. We are working jointly with the Bureau of Animal Industry on that, and are importing bacillus cultures from France and experimenting with them to destroy rats and mice and pocket gophers and ground squirrels, and we have succeeded in getting a bacillus that is fatal to some of the most destructive species of ground squirrels in Oregon and Washington, where they are doing several million dollars' worth of damage to-day. The people up there are very anxious to receive help. They have expended several hundred thousand dollars for poisons. The State has appropriated great sums for poisons, and has distributed poison by the carload in some of the counties in the wheat-growing district; but, as Mr. Wadsworth has said, a certain man in a neighborhood will kill off the animals, but his neighbors will not do it, and the result is that there is an overflow again in a few years, and it is just as bad as before.

Mr. LEVER. Do the farmers, as a general rule, follow your instructions to any great extent?

Mr. MERRIAM. Yes, they do; and they send us results that are very gratifying. On most of the larger ranches regular poisoners are paid the year round to fight the ground squirrels and the prairie dogs and also the coyotes. They have greyhounds and other dogs in connection with that work.

The CHAIRMAN. It is almost impossible to poison a coyote, is it not?

Mr. MERRIAM. Yes; but one method that is successful is to take a hen and rub some poison under her wings with grease, and as a general rule a coyote will come along and take some of that and get sick and leave it; and then another coyote comes along and sees that a coyote has been there, and that reassures him, and it takes some of it also, and in that way you can kill several coyotes with one hen. But they are very intelligent animals, and it is hard to get rid of them.

Mr. LEVER. Can you catch them with dogs?

Mr. MERRIAM. Yes; you can run them down with greyhounds. A good many are killed that way in the West all the time. The big range wolves also are run down in that way.

Mr. HASKINS. Can you not trap them?

Mr. MERRIAM. A very skillful trapper can catch a few, but they are very leary and wise.

Mr. CANDLER. Are they being exterminated?

Mr. MERRIAM. No; the plains wolves have increased during the

past ten years and have come back to the areas where they were almost extinct. After the buffalo days they became scarce, but since the cattle have increased they have increased also, and they are increasing faster than you can kill them, and you can not keep up with them. Those are the big lobo wolves.

The CHAIRMAN. They do kill a few young calves at times when the mothers are asleep or they have wandered off.

Mr. MERRIAM. You have not the big wolves in Texas that they have in the northern plains. In Nebraska and Montana and west of that you have a bigger wolf, more powerful than the small wolves in Texas.

The CHAIRMAN. Doctor, how do you ascertain these life zones?

Mr. MERRIAM. By traveling on the ground. A competent man who knows the creatures travels over the ground and runs lines. In a State like Oregon or Washington we run east and west lines and then north and south lines. But those are comparatively simple States, topographically speaking. In a complicated State like New Mexico, where there are broken ranges, it requires a much larger number of section lines, and in California it requires many more than elsewhere in the known world, the State is so diversified.

North of San Francisco Bay there are five parallel valleys with continuous mountain ranges without a break that come down nearly to the bay, and each of those valleys, as you recede from the coast, receives a smaller and smaller quantity of fog and a greater quantity of heat, and west of the mountains receives the heat of the afternoon sun, and the east slopes receive the beams of the morning sun, which give but comparatively little heat; so that each particular valley has a different set of horticultural and agricultural adaptations from the other. You can raise raisin grapes on one side, and perhaps claret-wine grapes on the other side of the same valley. You can raise olives, perhaps, on one side and not on the other side of a single valley.

The CHAIRMAN. That is the case with ordinary grapes in the East. We can raise a better grape facing the southwest than otherwise.

Mr. MERRIAM. Then here is a map of the Salinas Valley, California [producing same]. Nearly every day in summer a river of fog 2,000 feet deep flows over that valley, and it flows up the sides of the valleys off the Salinas Valley, while the fog from the coast is kept up by a high barrier; so that the fog from this Salinas Valley passes through the gaps and canyons much higher than the coast. If you travel west over the San Benito range you strike a valley where the temperature in the middle part of the day, say between 2 or 3 o'clock in the afternoon, will be from 110° to 115°, whereas in the Salinas Valley it will be 62°. Then turning east from the coast in the San Joaquin Valley it is 110° again, and in the valley east of that the temperature is 62°, and still east of that in the next valley it may be 85°, owing to the effect of the fog river coming in from Monterey Bay every day.

The CHAIRMAN. How do you ascertain these zones? You are ascertaining them, are you not, by animals and not by climates?

Mr. MERRIAM. We plat the climatic data we get from the Weather Bureau, and, as a matter of fact, we find they are coincident. The

mean annual temperature is of no consequence, but we get the total quantity of heat for a year for growth and reproduction, and we find that is the factor that governs the northward existence of southern species and crops. We find also that southern species in going south encounter a certain quantity of heat which is too great for them and checks their spread through the south.

We experimented a long time to find out what the trouble was. We found that it is the mean temperature of the hottest part of the summer, and for six weeks the mean temperature is sufficient to check the southern advance of southern species. We find further that a set of isotherms coincides with the southern limit of northern species as we have platted them on our maps. On the other hand, we find that the temperatures indicating the sums of the daily temperatures, the sums of the daily amounts for the total period of growth and reproduction, give us the northern boundaries for the extension of southern species. We check them off, and we find that they coincide with our work in the field. We check up the work in two ways—climatically and also by observation.

In California here, for instance, when we see the bigger Sabine pines in one valley we know that is a lower austral belt; that it is the great belt of peaches and pears and some other crops. We know the belt above that is the belt of yellow pine. It has a different set of crop adaptations.

The CHAIRMAN. Do you arrive at these results through your Biological Survey?

Mr. MERRIAM. Yes; absolutely and experimentally, by finding out what is in the country. We are driving stakes, you might say, along lines all the time. My personal work in California consists in doing this sort of work for six months in the year. We have only three men who can do this kind of work. It requires a man of training. You can not buy them. We have to know the trees and shrubs in the country from Alaska to Mexico. We have to know all the birds and mammals and reptiles. We see those in our work. As we go along on horseback or on foot, when we strike the first limit, we note it, and we record the altitude and the showings of the barometer, and we also note the distance from a known point, and the name of the species and the particular subspecies, and then we travel along and make a cross section of that belt, and find out how wide it is, and what the upper limit of it is. Then we find the next belt, where we encounter, for instance, the yellow pine following the digger pine. Then up above that we find the Murray pine belt, with another biological set of species. You can designate those by plants or birds or mammals or agricultural crops.

Mr. FIELD. Do you not find some species of animals having much more extensive range than others?

Mr. MERRIAM. Yes; we find some species common to two zones, but very rarely common to three. Heretofore instead of supposing that things were all of the same species, as, for instance, bears, we subdivide them into classes or subspecies. When I was a boy I understood that there were only two kinds of bears, the black bear and the grizzly bear. Now I find there are many species of bears. The same is true with the wolves. There are many species of wolves, and the same also with the coyotes. In the field a coyote is a coyote,

and we can not tell what species he is by sight. But we kill them and bring back their skins and study them here and lay out their species.

Mr. FIELD. Is that variation of the species due to climatic influences?

Mr. MERRIAM. Mainly to climatic adaptation, but not all. Some of the differences seem to be a perpetuation of normal variations of character, which are not harmful, but they form species, and we have to recognize those and use them in our one work. We find one form of coyote that is very fond of fruit, eating up the melon patches in California, for example; and another species will eat sheep. They will jump a high fence, whereas the plains coyote will not jump a fence higher than 3 feet.

The CHAIRMAN. That is funny. Although the coyote is an active animal, he does not seem to know how to jump.

Mr. MERRIAM. Yes. And an 18-inch fence will usually keep a jack rabbit out of a vineyard. It seems unaccountable.

The CHAIRMAN. Why do you examine the crops of birds?

Mr. MERRIAM. To find what they are eating. We have a corps of men who are spending their entire lives in examining the crops of birds, to find out what they are feeding on in each locality and region, and during each month of the year, so that we can tell whether a bird that appears to be injurious or beneficial at any time is really so the year round, and so for a number of years.

For example, we find that the bobolink is injurious during its migration in the rice fields, but it is beneficial through the breeding season in the North. We find, in the case of a vast number of birds that do a certain amount of injury, that their injury is limited to a few weeks or months and that their benefits, on the other hand, are practically continuous throughout the remainder of the year.

The CHAIRMAN. Why is the bobolink injurious to the rice fields of the South and beneficial to the North?

Mr. MERRIAM. He is beneficial to the North because he eats insects that prey on grain, and in the South he eats rice.

Mr. FIELD. Is the bobolink of the North the rice bird of the South?

Mr. MERRIAM. Yes; he changes his plumage.

Mr. FIELD. And is he the reed bird in Virginia?

Mr. MERRIAM. Yes; he is the same bird. We find a number of species of birds feeding on the tent caterpillar, especially the cuckoo. The grosbeak seems to prefer the potato beetle to any other food. You will find these beautiful song birds out in the potato patches eating the potato beetles, instead of disporting themselves in the branches of the trees.

Mr. HENRY. A pair of grosbeaks put in an appearance at my house one winter and stayed with me several weeks and then disappeared. What was the method in their travel? Why did they come, and why did they go?

Mr. MERRIAM. That is the northern grosbeak. Their migrations are irregular. We do not know just why. The supposition is that their food supply fails in the North and then they migrate to the South.

Mr. HENRY. They are fond of the mountain-ash berry?

Mr. MERRIAM. Yes; they are exceedingly fond of the mountain-ash berry.

Mr. FIELD. Is it true that the English sparrow has changed his habits in this country?

Mr. MERRIAM. He has not changed his habits, but he has multiplied inordinately. When you introduce a stranger species it does one of two things: It either finds itself in unfavorable surroundings and perishes, as has been the case with some birds that were introduced into Oregon—and it is well that they do perish, because without the Lacey Act it would be impossible to retain many of our native species here—or else they adapt themselves to their surroundings and proceed to multiply.

The CHAIRMAN. Don't you violate the Lacey Act?

Mr. MERRIAM. No, sir.

The CHAIRMAN. I thought you might have to, in order to collect your specimens to examine the crops.

Mr. MERRIAM. Most of those are sent to us by people in the various States.

The CHAIRMAN. Do they violate the law?

Mr. MERRIAM. No, sir; they do it under permit to search for scientific specimens. We get them to save the crops and stomachs for us, and we send them tags and jars of alcohol in which to put them. We have now 60,000 bird stomachs in our collection, of which we have examined about 38,000. We do kill birds at certain times; for instance, in the case of the boll-weevil plague in Texas, we have sent men down there for the last two years collecting birds in all seasons of the year throughout the infected districts.

Mr. FIELD. That is not a violation of the game laws there?

Mr. MERRIAM. No. They are exempt under those circumstances. We found thirty-eight species of birds eating the boll weevil, and in the stomach of one oriole we found forty-four boll weevils.

Mr. FIELD. Unfortunately those are not numerous.

Mr. MERRIAM. Yes; but the oriole is a showy bird, and the boys are likely to kill it off because it has a brilliant plumage, and to the plume hunters every such bird is worth its weight in gold ten times over, and the plume hunters in Florida and in other places have killed them off by the thousands. They have done that also with the blackbird of Texas.

Mr. LAMB. Are you ambitious to become immortal and have the highest monument erected to you that has ever been erected to any man?

Mr. MERRIAM. I have no such ambition.

Mr. LAMB. You would have that done for you if you would exterminate the English sparrow.

Mr. MERRIAM. You can not check it, and the reason is simple. We have made a recommendation that would do it, but it can not be carried out for the reason that the humanitarian people pop up everywhere the minute an attempt is made to carry it out. We recommend that in every town and city some man be appointed, under the administration of the city government, whose business it should be to destroy sparrows' nests, and that he be furnished with a pole and given a permit to go into the private yards and parks and pull down the sparrows' nests.

Mr. FIELD. They lay their eggs in one common nest, do they not?

Mr. MERRIAM. No; they lay in a great many nests, but one man

can absolutely prevent the multiplication of sparrows—that is, he can stop 90 per cent of the reproduction. The amount of reproduction is enormous. Each pair breeds half a dozen times in a season; but the minute you try that method a great humanitarian cry is started, and those people will get articles printed in the newspapers and develop a great amount of opposition to it and prevent its being done. That has happened over and over again.

The CHAIRMAN. You could not poison them with safety?

Mr. MERRIAM. No; they are the cutest things you ever saw. They get leary in a day. If you feed them in one spot and get them to come there regularly and then try to poison them you will kill one little bunch, but no more.

Mr. HASKINS. The sparrow is of no use whatever to anybody?

Mr. MERRIAM. No; they are no use, and they are very destructive to crops.

Mr. LAMB. They have killed all the singing birds down in my country.

Mr. MERRIAM. After a while they show a little more toleration to the native birds. They are not so abusive here to the native birds as they were. When I first came here they would mob almost every native bird that would come into one of the parks here. They are taking a place in our natural fauna and becoming milder and less aggressive.

Mr. FIELD. Do they eat insects?

Mr. MERRIAM. Once in a while they will chase a 17-year locust and play with him and pick him apart. He can not fight them. Sometimes they will chase a big butterfly and pull its wings out and eat a little bit of it; but they are of no account as insectivorous birds.

The CHAIRMAN. Is there anything further you would like to tell us along scientific or biological lines? Has any interesting work been done in the last year?

Mr. MERRIAM. Our work is constantly reopening work. This mapping work goes slowly, because we have only three men to do this. It is not a question of money; we can not get them, and that is the reason why I spend, personally, so much time in the field. I want to complete the West coast, at all events, personally.

We are now trying to introduce a bacillus to kill off the ground squirrels and pocket gophers and the rabbits. We are working on that especially this year, because they are such a plague to agriculture, particularly to wheat growing everywhere in the country.

Mr. FIELD. And did you find any boll weevils in the crop of the quail?

Mr. MERRIAM. Yes; but only a few. We thought we would find more.

Mr. FIELD. A man offered a reward of \$10 for every one found with the boll weevil in its craw.

Mr. MERRIAM. We found some wrens with the boll weevil in their stomachs. The quail eats the chinch bug. We have just published a bulletin upon his food.

The CHAIRMAN. He does not eat the cotton boll weevil?

Mr. MERRIAM. No; not to a large extent. The meadow larks eat it.

The CHAIRMAN. The weevil?

Mr. MERRIAM. Yes.

The CHAIRMAN. At what state does he get the weevil—when it falls off after it has done the damage, or before?

Mr. MERRIAM. Different birds take them at different seasons. The orioles search for them all the time. They find them when they are on the cotton boll, when they lay their eggs, and then in the ground during a part of the year, when the entomologist does not know what becomes of the weevil; but he is probably on the ground, lying amongst the bark and dirt and sticks. They get them at all seasons. When they are flying and lighting on the plants the birds catch them most.

The titlark, that breeds on the Arctic coast and comes down to Texas, also takes the boll weevil. We found a number of boll weevils in their stomachs. This bird does not light on the trees at all. It runs along the ground, and finds the weevil there.

Mr. FIELD. It is a little grass bird?

Mr. MERRIAM. Yes; it is a small lark.

The CHAIRMAN. Now, Doctor, I see you ask for an increase. What do you propose to do with it? It is an increase of about \$7,000. Your total increases in the lump sum appropriation amount to \$7,500. What do you propose exactly to do with that?

Mr. MERRIAM. We need approximately \$2,000 of that for an editor. Perhaps the most urgent needs of the Biological Survey now in the way of administration are an editor and another stenographer. We can not handle the work and answer the letters. We get thousands of letters every day, stacks of them, asking for remedies for various pests, birds, and animals. One man can not handle that work. We are now publishing a great many publications all the time. We have at the present time twenty-five publications that are in an advanced state of preparation, and some of them entirely done, on our desks, amounting in the aggregate to thousands of pages.

We have never had an editor, and I have had the editing to do personally, or else had to give it to some assistant, and it is poor business for the head man of an establishment to spend his time in editing what other people write. His time ought to be too valuable for that. The time has come when we really must have an editor. I have a list of twenty-five bulletins that we have now that are ready or nearly ready for the press, and not one of those is yet edited.

The CHAIRMAN. Read the list, if you please.

Mr. MERRIAM. Here it is [reads]:

BIOLOGICAL SURVEY PUBLICATIONS IN PRESS OR NEARLY READY.

Birds as destroyers of Scale Insects.
 Economic Importance of the Grosbeaks.
 California Birds in relation to Horticulture.
 Economic Importance of the Beaver.
 Ground Squirrels as enemies of the farmer.
 Directions for destroying Pocket Gophers.
 Field Mice in their relation to the farm and orchard.
 Eagles of North America in their economic relations.
 Distribution and Migration of North American Ducks, Geese, and Swans.
 Bounty Legislation for the destruction of Noxious Animals, 1905.
 Life Zones of northern Colorado.
 Birds of the Athabasca and Mackenzie Valleys.
 Mammals of the Athabasca and Mackenzie valleys.

Revision of the Skunks of the genus *Spilogale*.

Revision of Wood Rats of the genus *Neotoma*.

Methods in the enforcement of Game Laws.

Index of Game Decisions.

Index of Game Laws.

Laws for the protection of Birds other than Game Birds, 1906.

Summary of Game Laws for 1906.

Federal Game Protection.

Game on sale at Thanksgiving 1903, 1904, and 1905.

Poster on Close Seasons in North Carolina, 1906.

Poster on Close Seasons in Maryland, District of Columbia, Virginia, West Virginia, and North Carolina, 1906.

Poster on Close Seasons in United States and Canada, 1906.

As to bird destroyers of scale insects, it was stated before the New Jersey legislature a short time ago that no bird was known to destroy scale insects. We found 53 species that do. We found that the titmouse and the oriole eat the orange scale. We have prepared another bulletin on the subject.

The CHAIRMAN. You mentioned a bulletin on the "Economic Importance of the Beaver." Which beaver?

Mr. MERRIAM. The beaver is an animal not only important as a fur-bearing animal, which can be farmed as an industry at a profit, but it also is of enormous importance in the denuded foothills of the mountains, where the rainfall is drying up all the time. The work of the beaver in building dams every few rods and thus taking the water and allowing it to soak in is of immense value to agriculture. That is an important field that we have been working at in the last few years.

The CHAIRMAN. The beaver will not remain where civilization exists, as a rule.

Mr. MERRIAM. He will if he is not persecuted. We have places in Colorado, for example, right near the town of Pueblo, where there are immense colonies of beavers where they are not disturbed. In that respect they are like deer, that come into areas where they are protected. They come there and stay there.

The CHAIRMAN. What about eagles?

Mr. MERRIAM. Eagles are destructive to poultry and young sheep and lambs. On the other hand, they can do good by killing ground squirrels and prairie dogs. We are getting all the data together on the eagles of North America.

The CHAIRMAN. Is there not a species of hawk that is destructive to field mice?

Mr. MERRIAM. Yes; nearly all of them are, and the cause of the field-mice plague that has swept over the country from Massachusetts to the plains of Saskatchewan is the destruction of hawks and owls by the farmers.

The CHAIRMAN. People our way shot hawks this year by the hundreds, and our fields are covered with field mice.

Mr. MERRIAM. There are only a few species of hawks that are enemies to agriculture and poultry raising, while about 70 species are mostly beneficial by spending their entire lives in killing gophers and insects.

Mr. HENRY. You can not educate the farmer as to that?

Mr. MERRIAM. No. We published an illustrated bulletin showing which was the injurious and which the useful kind, but there was

such a tremendous demand for it that it was exhausted in a short time.

As to noxious animals, several States and Territories have bankrupted their State treasuries by paying bounties. A bounty always puts a premium upon dishonesty. A man will keep a bitch tied out where coyotes will serve her, and then he will take the pups and sell them for \$8 apiece. Sometimes in the case of wolves he will get as high as \$35 apiece, because there are State bounties and county bounties and bounties contributed by the cattlemen of the region, so that three bounties may be paid on the same scalp.

We are publishing in our Game Preservation Division, under Doctor Palmer, a collection of the laws for the protection of birds other than game birds, and also a summary of game laws of the United States. There is an immense demand for them. The last one on the list is the "Close Seasons in the United States and Canada." There was an immense demand for the edition of 1905, and we will have one out for 1906 in a few days. Then there is one for a special area, comprising Maryland, District of Columbia, Virginia, West Virginia, and North Carolina [indicating document]. We get this out every year, and also a digest of the game laws. The protection of game is, of course, a subject that is taking immense strides ahead in all the States all over the country, and the demand for general Federal legislation and for information is increasing all the time.

We have sent men to the meetings of the legislatures all over the country. The committees on game protection very often telegraph to us to send a man at once to be there at a certain day. One particular man had to start at 4 o'clock this morning to go to Richmond. He had just got back from St. Paul last week. Then he has to go to Massachusetts next week, and then to Albany. He has engagements to confer with the members of the legislature and advise with them on the subject of game protection. They are formulating a revision of the game laws.

We are trying to establish uniform game laws all over the country, taking into consideration the latitude and range, so that they will supplement each other, so that a man can not kill a certain kind of game on one side of a boundary line and be prohibited from doing it on the other side. Of course the traveling expenses of these men amount to a good deal. Sometimes they are paid by the legislatures of the States, and sometimes by the State game associations, and sometimes we pay them.

We have not paid for the inspection service until this year. In introducing birds and animals from other parts of the world there are hundreds of thousands that are brought in every year. I have a memorandum here of the number imported last year. There was 500 mammals, of which 200 were introduced under permit. There were 250,000 canaries brought in under permit, and 12,000 miscellaneous birds under permit, and 200 reptiles, besides other things.

The CHAIRMAN. Reptiles for menageries?

Mr. MERRIAM. Mainly for menageries. In the case of Hawaii there is a special law prohibiting the introduction of reptiles, because some of the people tried to introduce poisonous reptiles there, and they became alarmed and asked our Department to make a regulation prohibiting the introduction of reptiles, which we did. All these

invoices have to be inspected, and we have had representatives in New York, Boston, Baltimore, New Orleans, and San Francisco, and in the principal ports of entry, and have charged the importers \$5 for each inspection. The importers kicked very hard and employed lawyers to take the matter into court, and the Secretary of the Treasury notified the Secretary of Agriculture that there was no warrant in law for the exaction of these fees for inspection. So we now pay the inspectors \$5 for each inspection, so that the service would not fall through.

It is of great value to us to keep out the noxious birds and animals. For instance, the mongoose if it got a foothold would cause a loss of millions of dollars. It would be a terrible calamity if it were introduced into any one of the Southern States. It would be dreadful. The mongoose destroys the enemies of insects. It destroys insect-eating birds and the ground-nest-hiding birds and snakes and reptiles, and wherever it goes it is followed by a great plague of insects all over the country.

We had a case in San Francisco where one mongoose was labeled as a Philippine cat. The regular inspector was not there that day to see it. The deputy did not know it, but when he found that a Philippine cat was introduced his curiosity and suspicions were excited, and he traced the man who had it and went to his hotel. The man was not there at the time, but his wife was there, and he asked her permission to see the Philippine cat. He examined it and found it to be a mongoose. He grabbed it and confiscated it, although she protested, and the result was that we killed the mongoose. It was intended for introduction in the South.

The CHAIRMAN. Are they any good?

Mr. MERRIAM. They will catch rats. People in the South would like them because they would kill the rats that burrow in the leaves. But if they were introduced they would kill all the ground-nesting birds and the reptiles and insects. In Jamaica they have done untold damage.

The CHAIRMAN. Are they not easily exterminated?

Mr. MERRIAM. No, sir; you can not exterminate them at all. They are so crafty and cunning you can not destroy them.

Mr. HENRY. They belong to the weasel family?

Mr. MERRIAM. Yes.

The CHAIRMAN. How many litters do they have a year?

Mr. MERRIAM. I think they have about three in an average climate.

In many States a means of raising money for game protection is by charging licenses, as in Illinois, where 75 cents is charged for a license. They have raised so much money by that license that at the present time they have 115 game wardens, and they have \$98,000 in the treasury as a balance ahead to-day.

The CHAIRMAN. For game protection?

Mr. MERRIAM. Yes; they have a license fee of only 75 cents. Missouri started this year, for the first time, with a license fee of \$1.

The CHAIRMAN. A license fee for what? For hunting?

Mr. MERRIAM. Yes. In Missouri the fee is \$1.

The CHAIRMAN. I suppose the average man that gets that license thinks it is a permit to shoot anything he pleases?

Mr. ADAMS. In Wisconsin we get about \$100,000 a year as licenses. We have 65 game wardens.

The CHAIRMAN. Doctor, is it not true that the ordinary skunk, outside of his fur value, is valuable as a destroyer of a great many dangerous insects?

Mr. MERRIAM. Yes; particularly of the grubs that eat the roots of the vines.

The CHAIRMAN. And the clover vine?

Mr. MERRIAM. Yes. And the grub that eats the roots of the lawn grass. If the skunk can be induced to go to the lawn, he will take care of them. The skunk is a very beneficial animal.

The CHAIRMAN. They are rather queer. I have seen them right out on the range in Texas, without a tree in sight or a cover or anything, and then, again, you will find them in villages, right in the barns.

Mr. MERRIAM. Yes; around the houses. A lot of people have a superstition that the skunk is a serious enemy to poultry raising. As a matter of fact, 95 per cent of poultry raisers have skunks living all their lives right around their barns and poultry buildings. Ten house cats may be killing poultry everywhere all the time to one skunk. When a skunk gets to catching poultry it should be killed. As a rule they seem to know it is their business to hunt mice and insects. If you watch skunks in the evening when they come out, you will notice that they will start out in a field and as soon as they get to the edge of a field they will nose about and grab a bug; and then they will come to a rotten log and dig under it and dig out a mouse. They rarely kill poultry. They kill very few birds. There are a great many species of skunks.

Mr. FIELD. The skunk about the house is generally there for an evil purpose?

Mr. MERRIAM. No, sir.

Mr. FIELD. I thought as a rule he was a chicken killer.

Mr. MERRIAM. Yes; they will kill chickens once in a while, but very often when a cat kills it the killing will be blamed on the skunk.

Mr. COCKS. I want to ask you as to the uniformity of the State laws relating to game fowl and wild fowl along our coast. Is the uniformity increasing?

Mr. MERRIAM. Yes; every year.

Mr. COCKS. New York is particularly ahead on that.

Mr. MERRIAM. Well, it has been both ways. Just what was done last winter I do not know, but there was some bad legislation with respect to Long Island.

Mr. COCKS. Is there any objection to shooting wild fowl in the bays of New York in the winter?

Mr. MERRIAM. We want to stop it in the spring when the ducks begin to appear.

Mr. COCKS. If we could get it from the 1st of December to the 15th of March we would be satisfied. We have lots of birds up there now.

Mr. MERRIAM. Some people are overzealous. They want to go too far. The idea of the game law is to prevent undue increase of the game, on the one hand, and undue destruction of it on the other. Some people want to stop the shooting entirely.

Mr. FIELD. Where are the breeding grounds of the mallard ducks?

Mr. MERRIAM. They breed from the north of the United States

northward. They used to breed clear across the continent to California. It is a breeder over a wide area of country.

Mr. FIELD. It does not breed in the South?

Mr. MERRIAM. No, sir.

The CHAIRMAN. I understand the canvasback duck breeds in Alaska?

Mr. MERRIAM. Yes; more ducks breed in Alaska than anywhere else.

Mr. FIELD. How do you account for the disappearance of the wild pigeons?

Mr. MERRIAM. I can not account for that. Of course the wild pigeon was nearly exterminated in a great many places, about the time it disappeared, from the wholesale destruction of the squabs for market. That occurred in Michigan and New York and other places. But that fact does not seem to be sufficient to account for the old birds and all. I do not think any man can say how it was that that bird was exterminated.

The CHAIRMAN. Look how suddenly the buffalo disappeared.

Mr. MERRIAM. Yes, but we know how that was killed off.

Mr. ADAMS. As the States were settled up people would go into their nesting places and kill them by the thousand and tens of thousands. They were destroyed very young. I speak of the wild pigeons.

Mr. CANDLER. But there is a change of sentiment throughout the South as to game laws?

Mr. MERRIAM. Yes. The change of sentiment has been marked. We are concerned in the Biological Survey with the interstate shipment of game under the Lacey Act, and that keeps one of our divisions very busy. We found, as I stated here once before, that game is smuggled in in all sorts of ways, in barrels of potatoes and even in coffins, and in a great variety of other ways—even in bales of hay. Now, we find that tons of quail have been shipped through the East this winter in carload lots of eggs. We have detected the smuggling of game through East St. Louis on a special bridge. Apparently very little gets through Chicago. They are very alert now; but we have had 53 convictions under the act this year.

The CHAIRMAN. What are the penalties imposed?

Mr. MERRIAM. I do not remember.

The CHAIRMAN. It is a money penalty, is it not? Where does the money go?

Mr. MERRIAM. It depends upon the laws of the different States. The law of the State in which it is shipped out is the effective law.

Mr. CANDLER. It prevents the shipment out?

Mr. MERRIAM. Yes; it prevents the shipment out from one State to another in cases where the law of the State from which it is shipped prohibits the shipment, and the punishment is according to the law of that State.

The CHAIRMAN. Do you take a man back there to that State to be tried?

Mr. MERRIAM. Yes.

The CHAIRMAN. To the State from which the game has been shipped?

Mr. MERRIAM. Yes. There are various laws relating to the men

who violate the law in the beginning, and then to the men who handle the game, and then to the common carriers and express companies. They have got very leery about it. They are now cooperating with us. Two years ago they were trying to evade us, but they have had to give that up, just as in the case of ocean vessels. They have found it does not pay to fool with us.

The CHAIRMAN. The railroads will come to that in time? It is only a question of time?

Mr. MERRIAM. Yes. Now, you asked me as a practical question a while ago, what we need the money for. We need above all things an editor and a competent stenographer. At the present time we have to pay for this inspection service. We have never had to pay it before this year. It is a comparatively small item—not exceeding \$1,000 a year for the entire country.

Mr. CANDLER. What are the conditions that require it?

Mr. MERRIAM. When we require the importers to pay for the inspection of their goods, and they claim that where they were honest and did not try to smuggle in birds that are contraband it is a hardship on them to pay for the inspection. If they state they have imported 40,000 canaries and pheasants and parrots, and we find they did not import anything else when we make the inspection, then they claim that they should not pay for that inspection. The Secretary of the Treasury says there is no warrant of law for it and that the importers can not be forced to pay; that we have either to pay it ourselves or to drop it.

The CHAIRMAN. Can we not make then pay it by a provision of law?

Mr. MERRIAM. It is a small item. It keeps them irritated, however, all the time.

The CHAIRMAN. Yes; and you might say that the tariff keeps people irritated all the time.

Mr. MERRIAM. Yes. That is a question for the committee.

Then, the cooperation of the various States in the enforcement of the Lacey Act costs a great deal in a year in traveling expenses. We have to send men to Oklahoma and to New York and Maine and to Europe all the time, and we have never had any special appropriation for that. As a matter of fact, to get through the year we furloughed two of our men at the beginning of this month.

The CHAIRMAN. Now, to go back to the question that we have asked pretty often, Is there or not some line of work that you have finished?

Mr. MERRIAM. None are finished in our work at all, because it is progressive work. We have finished scale work in Texas, for instance, in one sense, on this zone map; and I hope we will get through with California some of these days, and we will get through with New Mexico and Colorado as soon as we can get men in the field to finish the work. One of the uneconomical features of our work is that we can not keep a man in an area anything like all the time. We have to bring him in and then wait till another year, and then send him out again.

The CHAIRMAN. The work is going on progressively all the time and probably as fast as the needs of the country demand?

Mr. MERRIAM. Well, there is a great deal of demand for these zone

maps of States. People are very anxious to get those. We get inquiries constantly about those.

The CHAIRMAN. From the commercial point of view, or——

Mr. MERRIAM. From the commercial point of view and also from the educational point of view.

Mr. ADAMS. What do you expend in connection with this inspection law?

Mr. MERRIAM. About \$8,000 under the game provision. We have three divisions in our work, the Geographical Distribution, the Game Preservation and Inspection Service, and the Economic Ornithology and Mammalogy. For the present we keep those separate.

The CHAIRMAN. What is the character of these importations that you have to inspect?

Mr. MERRIAM. They are importations of mammals and birds from all over the world.

The CHAIRMAN. For what purpose are they imported—for use, or ornament, or commercial purposes? What?

Mr. MERRIAM. Some of them are for exhibition purposes, for use of menageries, and some are for private preserves and pets.

The CHAIRMAN. There is no reason why they should not pay some inspection fee—a small fee?

Mr. MERRIAM. The great majority of them are for cage birds, pure and simple.

The CHAIRMAN. Canaries?

Mr. MERRIAM. Yes; and caged animals.

The CHAIRMAN. All going into menageries?

Mr. MERRIAM. No; often into individual persons' hands, as to animals.

The CHAIRMAN. In a way they are luxuries?

Mr. MERRIAM. Yes. Then there are others imported for propagation. Pheasants are imported for propagation. We have several pheasant farms in this country. We imported last year about 73,000 pheasant eggs for hatching.

The CHAIRMAN. Is there any place where they are successful?

Mr. MERRIAM. Yes; there is a successful pheasant farm right near Chicago, and another in New Jersey, and another near New York City. There is more of a demand for live pheasants and quail than can be supplied in this country.

Mr. HASKINS. You can also name another, and that is Doctor Webb's farm in Vermont.

Mr. MERRIAM. Yes; people want to buy them to stock preserves.

The CHAIRMAN. Not for food?

Mr. MERRIAM. Not yet. The demand for them for stocking preserves is so great that it can not be supplied in ten years. It never can be supplied in the case of quails.

The CHAIRMAN. The snows kill them off. You can get your country beautifully stocked with quail and one bad winter will wipe them out.

Mr. FIELD. Do you know anything about the results of the pheasants which were turned loose in southwest Texas near San Antonio?

Mr. MERRIAM. No, sir. Probably Doctor Bailey does. Those introduced in Oregon and Washington have colonized extensively and have become a nuisance. The wheat growers complain of them

especially. They eat so much grain that the wheat growers are opposed to them.

Mr. ADAMS. Doctor, I would like to ask you a general question. Is there any sufficient economic purpose in the protection of game through Federal and State laws aside from that of supplying a moderate amount of meat for popular consumption?

Mr. MERRIAM. There are two way in which it becomes an economic question. One is that you are supplying meat, which is an important consideration and amounts to many thousands of dollars every year—

Mr. ADAMS. Of course I understand that in the case of fish. That is an important element in the food of people.

Mr. MERRIAM. It is also so in the case of game.

Mr. ADAMS. Taken as a class, is the game an enemy of insect life?

Mr. MERRIAM. The quail is a decided enemy to noxious insects, but in the case of ducks and geese and the larger grouse, their status as insect destroyers does not amount to much.

Mr. ADAMS. I confess that I have been somewhat of a heretic on this question in my own State, and it seemed to me that the stringent game laws of the State were all absurd, and they are rapidly filling up the woods and unsettled neighborhoods with game and birds. Now, we can protect the lakes and streams on account of fish, which is the cheapest food that can be had, and the people can get it, and do get it. But I have sometimes doubted the wisdom of a State and national game law. However, I am open to conviction upon it.

Mr. MERRIAM. There is a good deal in the question, both from the meat side and from the sporting side and from the economic side.

The CHAIRMAN. Take the ordinary bear. Is he useful in any way?

Mr. MERRIAM. He is a pretty neutral animal. He feeds on lots of ants and gophers, and things of that sort, but chiefly on the roots of plants and on berries. Bears will kill hogs and sheep and cattle when they are pressed for other food. In places where bears are sufficiently abundant they can be considered a noxious animal.

We have the administration of the Alaska game law. We are sorry we have it, but it was given to us. It has given us a great deal of trouble. We have never had any money to enforce it, but we publish the regulations every year. There is no game warden in Alaska. The marshals and deputies do whatever they can, and sometimes they do more harm than good. The law is in a very unsatisfactory condition at present and does us a great deal of harm, because everybody blames us for what we can not help and do not believe in.

The CHAIRMAN. A great deal of the game up there is useful for food. It is mostly the larger game?

Mr. MERRIAM. Yes; moose and caribou and southeastern Alaska deer, and everywhere the ptarmigan, and everywhere sheep, and in most localities goats.

Mr. BROOKS. Are those sheep the mountain sheep?

Mr. MERRIAM. Yes. Those on the Yukon and near the Arctic are snow-white sheep.

Mr. BROOKS. Those are protected by restrictions?

Mr. MERRIAM. They are protected by law unnecessarily. The protection is needed in a few places like the Kenai Peninsula, which is

accessible to tourists and sportsmen. The biggest moose in the world lives there. It is as big as a big horse. Sportsmen like to go there from all over the world. These wealthy sportsmen from England and Germany and from the United States would like to go there and shoot those big moose and big sheep—those with the magnificent horns, in the mountains—and the caribou. They would exterminate them if they were not kept off, the same as they would exterminate the sheep and the moose. In southeastern Alaska about Sitka and along the islands deer were so abundant that for two hundred years, during the Russian occupancy, when Sitka was a town twice its present size, everybody lived on deer meat all their lives and yet there was no diminution of the deer. When I was up there six years ago the deer were brought in there in the morning by the Indians in canoe loads, and they sold for \$2 apiece. There is no diminution in the deer, they are so abundant throughout that region.

The law prohibits the killing of deer except during a few months in the year, and it makes it a crime for any one man to kill more than eight deer in one year. It simply cuts off the food supply of those people. They can not afford to buy beef. It has to be sent up by steamer from Seattle. I think it is an unjust law. I think two-thirds of the game laws of Alaska are pernicious.

The CHAIRMAN. Who passed that law, Mr. Lacey?

Mr. MERRIAM. I do not remember who passed it, but it is a very bad law.

The CHAIRMAN. Why do you not make a draft of a modification? If you would, I will take pleasure in talking to Mr. Lacey, or whoever was the author of the original bill, and take it up.

Mr. MERRIAM. Thank you, sir. The Senate sent for me a few years ago, and pitched into me as if I was the father of that law. Their first idea was to repeal it altogether. We do not want to do that, because that would kill off those big moose in the Kenai Peninsula. I think there should be passed a substitute for or amendment to the other law, which is unjust. It invites the breach of the law continually.

The CHAIRMAN. What other increases have you, Doctor? Does that cover all?

Mr. MERRIAM. This matter of Alaskan service is one of the matters we have to support. Then this cooperative service is another thing I want to speak of. We are asked every year by various States to cooperate with them in their biological survey. We have not been able to do it because we have not had any funds to spend in that way. We do not have enough to go on the area we were working, so that we have always declined. As to this work on California ornithology that we have begun, we wish to continue and prosecute that work to a finish and send men out this year in the growing season.

The CHAIRMAN. It strikes me you are doing most of your work on the California coast.

Mr. MERRIAM. No; we are doing our work wherever we can do the most good—out in the western and southern country, where they are suffering the most from the pests, the ground squirrels, and pocket gophers, and boll weevils. We want to keep our present force of men down in Texas, with a view to finding out what birds do feed on the boll weevil.

The CHAIRMAN. Have you not found that out already?

Mr. MERRIAM. We have found 38 of them and which of those are the most useful, but one man at a time can not cover all the districts at once. It is quite a large job. We have examined, as a matter of fact, over 3,000 stomachs of birds in the boll-weevil cotton district, and we have found 38 species that feed on them.

The ground-squirrel pest is something that we want particularly to devote ourselves to with more energy than we have devoted to it heretofore, and those are cultural experiments.

The CHAIRMAN. What do you mean by that?

Mr. MERRIAM. Introducing contagious diseases among the pests by means of cultures. We are testing cultures here, and the Bureau of Animal Industry is doing the field work.

The CHAIRMAN. In layman's language, you are trying to introduce diseases that will kill them off?

Mr. MERRIAM. Yes; the same is true with the gophers and the prairie dogs and the field mice.

The CHAIRMAN. I think anybody could do it with the prairie dogs, as it has been done time and time again.

Mr. MERRIAM. The trouble is people will not cooperate. But if you get a contagious disease it will spread over the land of the man who will not do anything, and in that way it will become effective over all.

Mr. BROOKS. I have heard of whole counties where the prairie dogs have been absolutely eradicated by a contagious disease.

Mr. MERRIAM. I know of places where he has been reduced by poison and by bisulphid of carbon, but—

Mr. BROOKS. I went over sections last summer on horseback for many miles where they said they had got from the Department a self-propagating germ and had inoculated the prairie dogs with some disease, some contagious disease, and it wiped them out.

Mr. MERRIAM. Where was that?

Mr. BROOKS. This was in Rio Blanco County.

Mr. MERRIAM. Somebody lied to you. It has never been done by us in this country. We have been working on it for several years, and now we think we have got two bacillus diseases, but up to this time it has not been tried.

Mr. HASKINS. Supposing it is true that you find thirty-eight additional species of birds that live upon the boll weevil; what practical benefit would that be to the planters?

Mr. MERRIAM. We notify them at once of the birds that are doing this, and notify their legislatures, and the legislatures will pass laws to protect those birds, and the farmers themselves will see that those birds are protected. We found they were very ready to take the result of our work at once. When we tell them we found 41 boll weevils in one oriole, after that they would tar and feather a man who would kill an oriole.

Mr. HASKINS. They are protected everywhere by State laws?

Mr. MERRIAM. Yes; but still they are killed everywhere.

Mr. HASKINS. I have a female oriole that comes to my place every spring—

The CHAIRMAN. They come back to the same habitat?

Mr. MERRIAM. Yes; to the same spot to nest, to the same tree.

There are a number of species of oriole in Texas that we do not have here.

The CHAIRMAN. Does this cover the whole ground of your increases?

Mr. MERRIAM. Yes.

The CHAIRMAN. Last year we passed a bill to bring a herd of elk in. What are they?

Mr. MERRIAM. The San Joaquin elk.

The CHAIRMAN. Tell us about that.

Mr. MERRIAM. Yes. Down in the San Joaquin Valley, in southern California, there is a small species of elk, which is confined to that region. It is very much smaller than the ordinary elk. It is pale golden fawn color. The surviving individuals of that herd have lived for some years on the immense cattle ranch of Miller & Lux. They have become a great nuisance there, but the State law protects them and the ranchmen have given them their protection. But a few years ago Miller & Lux offered them to the Government, and agreed to catch them and load them on the cars for us. I submitted the matter to the committee here, and was given an appropriation, first, of a thousand dollars to fence in a park. We selected a place on the Kaweah River, a part of the Sequoia National Park, and the expenditure was purely for fencing and for hauling. In the first place, we selected a canyon that had deep lateral walls and led high up in the mountains, a thousand feet, so that there would be no escape of the elk. We put in a fine woven-wire fence.

The CHAIRMAN. What fence did you use?

Mr. MERRIAM. We built a fence that was woven on the ground. A Michigan company has an agent out there in Visalia. He did it for us. It will give us perhaps the cheapest fence that ever was put up.

The CHAIRMAN. How high is it?

Mr. MERRIAM. I think it is 5 feet.

The CHAIRMAN. Will they molest the fence at all?

Mr. MERRIAM. Oh, yes; they will to get into the alfalfa fields. They did that with Miller and Lux. Miller and Lux thought they could drive these elk, and they appointed the 12th of November a year ago as the date, and they got all the vacqueros they could get from the friendly rancheros, and we got all together about 40 post riders in the State of California. The question was whether the elk would or would not drive. They started and led down to the big corral built for them, and ran about 2 miles toward the corral, and then suddenly turned; and when they turned they were met by this army of horseback riders, and the elk simply went between the horses. The horses turned and followed them up and tried to press them round and drive them back, and the riders tried to use their lariats to effect that purpose, but the elk would slide right between the horses and never deviate from their course at all.

When it was found they could not be driven, some of the vacqueros roped them, although they were instructed not to. We got ten elk alive. A number of others that were captured died. The temperature there was very hot and they were heated and distressed in the running. That was the first year.

Then last year Miller and Lux agreed to make the first drive in May. Then they put it off until June, and then until July. I went

down there and stayed a few days and the temperature was 106. These elk live in a very hot country. It is a widely different animal from the mountain elk. Then Miller and Lux deferred the date until the fall, and we made the run this fall and caught quite a number of the elk. They got 25 of them into the park and got them moved up. Meanwhile our money had lapsed, and I was in a very embarrassing position. I told them that we would not pay for anything after that. The railroad hauled the car for nothing and the trolley line carried it up to Lemoncove, as far as its track went, and then some volunteers brought some mule teams and hauled these elk up. It took three days to make the round trip up to the elk park. That was done free. We did not pay a cent for it. The men contributed their services.

The CHAIRMAN. How many acres do you count you have inclosed there?

Mr. MERRIAM. It is narrow. It will not average a quarter of a mile, but it is good ground, with stacks of food on it, sufficient to feed 500 elk.

Mr. COCKS. Is not the temperature there colder than they have been used to?

Mr. MERRIAM. They can go up into a colder range, but in the lower end of that valley they can raise oranges.

Mr. COCKS. I do not understand how you caught those loose ones.

Mr. MERRIAM. They were caught and roped. Miller and Lux went to all the expense both years.

The CHAIRMAN. They wanted to get rid of them. They were destructive of their alfalfa fields.

Mr. MERRIAM. They had wagons there, profiting by the first year's experience, and got to the elk as soon as possible after they were caught so that there were comparatively few deaths.

The CHAIRMAN. How much will the female weigh?

Mr. MERRIAM. I should say not exceeding 300 pounds, and perhaps not over 200 pounds.

The CHAIRMAN. That is not much more than a big sheep.

Mr. MERRIAM. Four men can handle the big bulls. I have seen three men lift a bull into a wagon. We saw the horns off the bulls the first thing. It has to be done. They are vicious fighters.

The CHAIRMAN. How many more have Miller and Lux?

Mr. MERRIAM. They apparently have 150 still.

The CHAIRMAN. Do they want the Government to take them all?

Mr. MERRIAM. They do not want to kill them, but they want to get rid of them. We have got enough for the herd.

The CHAIRMAN. You can perpetuate the species now. They are practically of no account?

Mr. MERRIAM. They are good for beef, for meat; but the State law will not allow anybody to kill them, and the sentiment of the people is against it. Sometimes one will be killed by a fellow who wants the teeth. The teeth are worth \$20.

Mr. COCKS. Has the Government got a herd of buffalo of any account?

Mr. MERRIAM. There is a herd of buffalo in the Yellowstone Park, under the Department of the Interior, and Buffalo Jones has a mixed herd in Colorado, along the Palo Alto border line of southern Utah, along in there [indicating on map].

The CHAIRMAN. The commissioner of the Zoological Park in New York has offered some buffalo to the Government?

Mr. MERRIAM. Yes; the Wichita Reserve has been considered. Nothing has been done about it.

The CHAIRMAN. I thought they agreed to deliver them?

Mr. MERRIAM. I do not know about that.

Mr. FIELD. There are a good many on the Goodnight Ranch, in western Texas.

Mr. COCKS. I noticed one in the Flathead Indian country, in Montana. My attention was called to the herd owned by an old Indian. Some of my people, among others Dan Beard, editor of Recreation, are very much interested in trying to get the Government to buy that herd. It is the largest single herd in the United States.

The CHAIRMAN. What is that, Cocks?

Mr. COCKS. It is an Indian herd. It belongs to an Indian or half-breed named Tablo. They were very much interested about it, and they talked to me last summer, and I supposed they had gone ahead to do something about it.

The CHAIRMAN. If there is nothing further, Doctor, I want to say we are very much obliged to you.

Thereupon, at 1 o'clock p. m., a recess was taken until 2 o'clock p. m.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
February 8, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth, chairman, in the chair.

The CHAIRMAN. Mr. Hough, from St. Louis, representing certain interests, is before us this morning, and we will hear him first.

STATEMENT OF MR. WARWICK M. HOUGH, OF ST. LOUIS, MO.

Mr. HOUGH. Mr. Chairman, I represent the National Wholesale Liquor Dealers' Association of America, who comprise most of the distilling interests and wholesale interests in the United States, and also the importers of America. There are two subjects I want to discuss. I represent both interests in the matter.

As a matter of fact, all of the importers of the United States, most of whom are located in New York, are members of the association which I represent. This matter was presented to me by them about a year ago, at which time it was too late, as I found, to take it up with this committee. It has to deal with the increasing power which has been conferred, under the agricultural appropriation bill, upon the Bureau of Chemistry of the Department of Agriculture, and I wanted to request the committee, on behalf of those interests, this morning, that certain paragraphs be stricken out of the appropriation bill and that certain other paragraphs—paragraphs conferring power—should have been thrown around them more safeguards than the bill now contains.

The first of these matters is in the bill, at the top of page 27, about the third line, in the estimates of appropriations for the Department of Agriculture. You will find there the words "and to publish the results of such investigations when thought advisable." There is no

objection to their publishing the results of any investigations that they make, provided that in the publishing of these results they do not publish the name of a dealer who is charged with anything in connection with the results without affording the dealer a hearing before the Secretary of Agriculture himself in his own defense. In other words, do not prejudge him merely upon the judgment of some chemist of the Department without giving him an opportunity to be heard in his own behalf and giving him an opportunity to demonstrate either that the conclusions of the Bureau of Chemistry of the Department of Agriculture are wrong or that the analyses are incorrect.

As it is now, and it has been going the rounds of the papers for quite a while, and I presume those statements have emanated from the Bureau of Chemistry of the Department of Agriculture, they propose to adopt this very stringent method of pillorying a man without giving him any hearing at all. That is un-American and is unfair, and I think if that power is to be left in the bill it should provide also that no statement reflecting upon any dealer should be published by the Secretary of Agriculture without first giving him an opportunity to be heard.

The second place in the bill is four or five lines further on: "To determine their relation to digestion and to health, and to establish the principles which should guide their use." One object of these suggestions is that the Department of Agriculture and the Bureau of Chemistry should be more strictly confined to the purposes for which it was created, that is, for agriculture, for growing things, for animals and for animal food.

The CHAIRMAN. Before you touch upon that, let me refer you back to the bill, to this language which you have read: "To publish the results of such investigations when thought advisable."

Mr. HOUGH. Yes, sir.

The CHAIRMAN. Has there been any abuse of that power?

Mr. HOUGH. I think nothing has been done as yet.

The CHAIRMAN. Has the Secretary of Agriculture ever done it when he was not justified? Has he ever advertised the names and the goods when he was not justified in doing so?

Mr. HOUGH. I am not advised that he has published any names as yet; but it was printed in the papers that he had obtained an opinion from the Attorney-General that under this provision he would not be liable for damages if he should do that, and it was also stated in a paper that that was the course they were going to adopt in relation to all food manufacturers. Now, I say that it is generally assumed, since these statements have originated in or emanated from the Bureau of Chemistry of the Agricultural Department, that that was what was proposed to be done, and the proper thing for the manufacturers to do is to take time by the forelock and offer their protest against that.

The CHAIRMAN. I did not know but there were specific complaints.

Mr. HOUGH. No, sir; no specific complaints.

Mr. ADAMS. What amendment would you suggest there?

Mr. HOUGH. I had not framed one. I thought I would suggest the idea to the committee, but if there was one I would suggest that it be to the effect that no results should be published with or without the name of the party until the party himself had had an opportunity to be heard before the Secretary of Agriculture. Naturally they would not want to be heard if—

The CHAIRMAN. You notice that does not give the power really to give the names of the dealers. It has been suggested that we should put in this bill authority to publish the names of the dealers. This is simply to publish the results of the investigations.

Mr. HOUGH. They undertake to do so, or at least it has been stated publicly and so frequently and in so many different papers all over the United States that they were going to do this, that I take it for granted that that is what they propose to do, and it is for that reason that the manufacturers of the country who would be affected want to take time by the forelock. They do not want that thing done.

The CHAIRMAN. I understand.

Mr. HOUGH. If they are going to publish the results of investigations merely to show that certain things are in their opinion deleterious to health, there can be no objection to that. But if they are going to state that Mr. Jones manufactures an article of that kind and is selling an impure food, of course there is serious objection to that.

But in the light of the published facts—I mean in the light of articles in the papers—they are going to go further than that, and the suggestion that the chairman made, that they want to add the names, shows that the purpose is to judge, condemn, and execute the individual without a hearing, because there is no provision made for a hearing. Now, that is an improper power in the first place; it is too extensive a power in the second place, and it is not safeguarded in the third place, as it ought to be.

The CHAIRMAN. In relation to foreign goods we give that power. Down at the bottom of the page you will see that the Secretary of the Treasury has been directed to refuse delivery of goods.

Mr. HOUGH. I am coming to that.

The CHAIRMAN. You want to touch on that?

Mr. HOUGH. Yes, sir; when I come to it.

The CHAIRMAN. Excuse my interruption. Proceed in your own way.

Mr. HOUGH. I am coming to that.

The CHAIRMAN. Take them in order.

Mr. ADAMS. Just one question. Do you think it would be against public policy if the Department of Agriculture, having ascertained that an article was adulterated and sold by a certain firm, should state to the public that it was adulterated and was sold by that firm?

Mr. HOUGH. Not after the firm had been given notice of the fact and had opportunity to combat the theories of the Department of Agriculture, but prior to that I think it would be improper.

Mr. ADAMS. It certainly would not be wise procedure on the part of the Department of Agriculture to do that without giving the amplest opportunity for the defendants, as you might call them, to prove their case.

Mr. HOUGH. Yes, sir.

Mr. ADAMS. It is hardly supposable that the Secretary of Agriculture would wish to do any injustice, or that he would abuse that power. Now, you take it in the execution of the various food laws of the various States, this same policy is carried out which is indicated here, with perhaps no more restrictions.

Mr. HOUGH. Yes, sir; and there has been a great deal of complaint, and I have had occasion to present this same idea to different food commissioners and they have all agreed that it is improper to do that

without a hearing, both on the facts and on the correctness of the investigations made.

Mr. ADAMS. You have not any authoritative statement from any representative of the Agricultural Department that they would refuse to do that, have you?

Mr. HOUGH. No, sir; I have not. The only point I make is this: In granting power it ought not to be made so unlimited and broad as that anything might be done. You may have a perfectly conscientious man at one time occupying the position to use that power and a very unconscientious man at another time. The only correct procedure, it seems to me, is to assume that the utmost that can be done under the power will be done. A law, in being passed upon to determine whether it is a good or a bad law, must be judged by everything that can be done under it, and it ought not to be passed simply because somebody says it will not be enforced to its fullest extent. Therefore, when there are as large interests as are involved in this matter in the United States—and they are very vast—this committee or any committee of Congress ought to throw as much protection around any power to do any act which may affect or injure that business as is possible and consistent with the object intended to be accomplished.

Mr. FIELD. I would like to ask you a question. Is it not quite doubtful, often, whether a certain ingredient is injurious to health, and would not an issue be raised at once between the chemists of the Department, and, you may say, an expert representing the producer, so that the public would be confused as to the real truth? Is not this statement given out by the Agricultural Department nothing more nor less than the opinion of the Department that it is deleterious?

Mr. HOUGH. Yes, sir; but it is accepted as final by so many people. That is why we say it is misleading. The public have already been misled as to the deleteriousness of certain ingredients by statements that have emanated from the Department of Agriculture; and the Bureau of Chemistry of the Department of Agriculture has changed its opinion many times with respect to the effect of these added ingredients, to such an extent that the thing would be declared deleterious to health at one time and at another time it would be declared not to be deleterious to health.

Now, the food interests of the country ought not to be subjected to such a variable rule as that. It is true that the question would be raised all the time as to whether such a thing was deleterious to health, and we think that the ipse dixit of one man ought not to be accepted as final on that proposition. If it is a matter of sufficient importance to the health of the community there ought to be a board appointed of food experts in the country who would have no connection directly or indirectly with the Bureau of Chemistry of the Department to pass upon that issue. It is just as important to the people who are manufacturing and using foods to know that certain things are in there which a certain chemist might regard as deleterious to health as it is to the Department of Agriculture. The theory is that they are doing this for the benefit of the people.

Mr. HENRY. In your opinion, would the decision of such a board as you refer to, of disinterested persons, be any more disinterested than that of the Department of Agriculture? Why should the Department of Agriculture be interested in this matter, except in a purely scientific way?

Mr. HOUGH. I did not catch quite all of your question. But why should the other people—

Mr. HENRY. You say that a disinterested board should be appointed to pass upon it. Why should that board be more disinterested than the Department of Agriculture and the Bureau of Chemistry?

Mr. HOUGH. Because the Department of Agriculture and the Bureau of Chemistry occupy the position of prosecutor to start out with, because they bring the charge. They should not also occupy the position of the jury. Get a jury from somewhere else, and do not let them be prosecutor and judge and jury and the sheriff to execute the judgment.

Mr. ADAMS. This is simply a publicity law, and I suppose you would prefer the enactment of some such measure as the Hepburn bill?

Mr. HOUGH. One point I wanted to make is that all these provisions should be stricken out, because it should await the action of Congress on pure-food legislation, and this committee should not attempt to accomplish through the provisions of a bill like this what Congress has refused to grant them the power to do in a direct manner, and that these things which are now being done are not necessary.

Mr. ADAMS. But Congress has not refused that.

Mr. HOUGH. They have, until they pass a pure-food bill.

Mr. ADAMS. No. The proposition has not come before Congress in this form or anything like it.

Mr. HOUGH. I have a copy here of the Hepburn bill, and I understand the provisions of the Hepburn bill cover everything there is in this.

Mr. ADAMS. Yes, and a great deal more.

Mr. HOUGH. Yes, and a great deal more.

Mr. ADAMS. This is simply a publicity law.

The CHAIRMAN. As to the pure-food bill, a good many of us think that the power granted here is sufficient and that there is no need of a pure-food bill.

Mr. HOUGH. I think there is more need of legislation to help the States. I am in sympathy with the people of any State who say that because of the interstate-commerce clause of the Constitution they can not enforce their laws, and I think a law should be passed which removes the restriction of that clause of the Constitution in so far as it is possible to do it and to aid the States. But this is far more comprehensive, and gives a far more extensive power in some respects than is undertaken to be given by any of the pure-food bills that have been presented.

Mr. ADAMS. This clause we are discussing simply authorizes the Secretary of Agriculture to make investigations and publish those results. There is no effort to enforce the law in this particular case. They are simply given authority to publish, and there is no prosecution under it.

Mr. HOUGH. But suppose the Department of Agriculture says that a sample of something taken from Smith & Co. is found to be impure and deleterious to health? Now, that is accepted as a fact among the people of the country. You may not accept it. You may understand that that does not mean anything, perhaps, or that it does not mean everything that it would imply to the uninitiated all over the country; but the people around the country will say: "We will buy no more of that article from Smith & Co., because the Department of

Agriculture, which is the judge in this matter, has said that it is deleterious to health."

Mr. HASKINS. How can it be said that the Bureau of Chemistry are prosecutors in this matter, or that they are anything else than a fair and impartial tribunal, as between the manufacturers and the people?

Mr. HOUGH. I say when they make a statement that something you are selling is impure and adulterated they are, to a certain extent, making a charge against you. The man who makes a charge is the prosecutor, and he should not be also the sole judge of whether the charge he makes is true in fact and true as to conclusions. He is entitled to be considered, and his views are entitled to be considered on that point, but he should not be the sole judge as to the truth of the charge which he makes. I only use the word prosecutor as illustrating the attitude of any person who would make a charge, who states a fact; only in that sense. I did not mean that the Bureau of Chemistry is necessarily the prosecuting attorney.

Mr. HASKINS. What interest has the Bureau of Chemistry to make a charge that is untruthful?

Mr. HOUGH. I do not suppose they would make a charge which was knowingly untruthful; but they may be mistaken in the facts, and it is just as damaging to the man against whom the charge is made, whether it is a mistake in judgment or a mistake in an attempt to state a fact.

The CHAIRMAN. Mr. Hough's point is that, like lawyers and doctors, chemists disagree, and the Government chemist is as apt to make a mistake as a private chemist.

Mr. HOUGH. Exactly.

The CHAIRMAN. The Government chemist is as apt to make a mistake as any other chemist?

Mr. HOUGH. Yes, sir.

The CHAIRMAN. That is the point.

Mr. HOUGH. And the Government chemist has made a mistake, because he has changed the standards with respect to certain ingredients within the last year. A bulletin issued by him yesterday is a radical change in the attitude of the Bureau. That was telegraphed to the Chicago Tribune. The Bureau has made a radical change in its attitude from what it was a year ago. Now, if he is right to-day he was wrong a year ago, and if he was right a year ago he is wrong to-day; so that the Bureau of Chemistry of the Department of Agriculture does not undertake to say, as I understand it, that they consider themselves infallible.

Mr. ADAMS. What particular marked change is there that you can specify in that?

Mr. HOUGH. I will come to that. It is on the use of preservatives in food products and the use of certain acids. I have a copy of that here, and I will read the whole clipping. I had probably better suggest all these paragraphs in the bill which I have marked, and then I will take them up. I will state that I wrote a protest covering a part of this to the Secretary of Agriculture, and I will read that protest to the committee. The protest was referred to the Chief of the Bureau of Chemistry, and it has probably been pigeonholed, but it states certain facts with reference to the reasons why these powers ought not to be given in probably a clearer manner than it would appear if I should talk and give it to you extempore.

The second point in the bill here was on the language—

To determine their relation to digestion and to health, and to establish the principles which should guide their use.

The third place is further down, where it says:

To enable the Secretary of Agriculture, in collaboration with the association of official agricultural chemists and such other experts as he may deem necessary, to establish standards of purity for food products and to determine what are regarded as adulterations therein.

The fourth is further down, and reads:

To investigate the adulteration, false labeling, or false branding of foods, drugs, beverages, condiments, and ingredients of such articles, when deemed by the Secretary of Agriculture advisable, and report the result in the bulletins of the Department, and laws, regulations, and decisions relative thereto.

I see that the language "and laws, regulations, and decisions relative thereto" is an added clause. The entire remainder of that provision of the bill applies to imported goods. Now, the power to investigate the adulteration of foods, which is proposed to be stricken out, just prior to that part referring to imported articles, is covered by a provision commencing at the bottom of page 26 of this bill, and it appears to be a repetition, excepting as to the right to publish the results. Publishing the results is covered by the clause above referred to. The only additional paragraph is that reading "and laws, regulations, and decisions relative thereto."

Now, I received a letter on that subject from a gentleman in Chicago, who has been publishing the laws and regulations in respect thereto, and he states that the matter which the Bureau of Chemistry now has, he furnished; and if the Bureau of Chemistry is going into the business of publishing a pure-food journal, it competes with him and knocks him out of business, and I do not think the Government ought to undertake to compete with an individual or to run him out of business.

There is more that will be said upon that subject, because I think that Mr. Lorimer, who is a member of this committee, has had the matter presented to him, and it is a constituent and friend of his whose interests would be affected in this way. It seems all right in the bill if you did not know anything about the outside facts; but when you know that this would take the place of the work that somebody else is performing, naturally it would strike the committee as improper to put the Government in the attitude of competing with somebody else in that way. Now, the protest which I wrote to the Secretary of Agriculture bears upon one phase of these objections which applies to the establishment of definitions and standards, and this applied only to the establishment of definitions and standards for whisky, and in connection with that objection the definitions and standards which the Chief of the Bureau of Chemistry was attempting to establish, and which were alleged to be erroneous; and the shortest way is simply to read the matter as I wrote it to the Secretary. It reads as follows:

OCTOBER 17, 1905.

HON. JAMES WILSON,
Secretary of Agriculture, Washington, D. C.

SIR: Inasmuch as the time is drawing near when we may expect a renewal of the systematic agitation for Federal pure-food legislation, which to all appearances has had its center in the Bureau of Chemistry of your Department, I deem it expedient to advise you of my understanding of what the Chief of that Bureau has been and is attempting to accomplish, in one particular at least, of which you may not be fully advised.

I speak with respect to distilled spirits, though I have been informed by other crude manufacturers that analogous situations exist with respect to other food products.

The late pure-food bill was not, in my opinion, generally understood, even by a majority of its advocates, and while it seemed to announce only general principles upon which all could agree, it was full of snares and pitfalls, which lay chiefly in the proposed or probable application of such principles.

Everyone will agree that every commodity should be truthfully labeled, but there may be a disagreement as to what is a truthful label. For instance, a bottle labeled "whisky" should contain what is commonly understood by that term.

If, however, it should lie within your power to establish a definition for whisky which should exclude that article which has commonly been known as whisky for several hundreds of years, and you should do so, anyone continuing to ship such an article under the designation "whisky" would render himself liable to prosecution and subject his goods to forfeiture.

The snare in the bill therefore lay in the fact that in its practical operation the bill could be made to mean one thing or another, dependent upon the definitions and standard, in the light of which it might be construed.

Authority has been given you from year to year under the agricultural appropriation bill to establish standards of purity with the assistance of the Association of Official Agricultural Chemists and such other experts as you may deem necessary.

As that association is largely composed of chemists who have an official relation with the Bureau of Chemistry of your Department, and the Chief of the Bureau of Chemistry of your Department and officers of experimental stations are members of the food-standards committee appointed by the Association of Official Agricultural Chemists, and you have called no other food experts to your assistance, the power thus conferred by the annual agricultural appropriation bill practically resolves itself into authority to establish such standards as may be recommended by the Chief of the Bureau of Chemistry.

I may add in passing that I am informed that such standards as have already been promulgated by you, upon the recommendation of the committee referred to, have been rejected as inaccurate and impracticable by the National Association of State Dairy and Food Departments, an organization which comprises all of the State officers and their assistants who are engaged in enforcing the pure-food laws of the several States.

If, in addition to the powers to establish standards of purity, you should be led by the Chief of the Bureau of Chemistry and his food standards committee to also adopt definitions, the vested rights of manufacturers of the country under the proposed pure-food bill, or any bill which deals only in such glittering generalities, will depend largely upon the mental attitude of the Chief of the Bureau of Chemistry.

On the subject of whisky, his attitude is now no longer in doubt, and the success of the plans of the present Chief of the Bureau would not only result in the subversion of a long-established definition, and the foisting upon the public under a false and fraudulent guaranty of purity of a highly deleterious and unwholesome article, but it would ultimately result in a loss to the Government in revenue of about \$30,000,000 annually.

The reputation which has been achieved by any brand of whisky, or the reputation which any particular part of the country has obtained for producing fine whisky, has been created by the rectifier and the blender, who, by his processes, has converted a heavy, heady, unpalatable, and noxious distillate, containing unwholesome and deleterious substances, into a light, palatable, and much more wholesome and harmless beverage.

The result of these methods of the rectifier and blender has resulted in such a large increase in the consumption of distilled spirits that the revenue therefrom now amounts to approximately \$130,000,000 annually, or fully one-fourth of the entire annual income of the Federal Government.

The term "whisky" and the term "usquebaugh" from which it was derived, was first applied to a blended or compounded article, to which flavoring and coloring were added, which was first distilled exclusively from malt in a pot still, and was so applied almost exclusively in English-speaking countries for the five hundred years prior to the nineteenth century. By that time there were such improvements in the method of distilling and redistilling (rectification) that the term was extended to include not only a straight distillate, but a distillate made from other material than malt, and by improvements on the old-fashioned pot still, which originally was nothing more than a teakettle.

A flavored and colored blend of different spirits, however, continues to this day to be the most popular and wholesome whisky in both England and America, and almost the exclusive alcoholic drink.

While you have no authority whatever to establish definitions, the Chief of your Bureau of Chemistry now proposes to restrict the term "whisky" to a straight distillate, to which it did not originally apply, and to exclude it from that alcoholic beverage to which it was originally exclusively applied; and while the press of the country this spring was reporting you as saying that you indorsed all that was being done by the Chief of the Bureau of Chemistry, and that you did not believe he was using his office to advance the interests of one set of manufacturers as against another, he was engaged in advising the British public, through contributions to trade journals to buy only bottled-in-bond whiskies. (See the Wine Trade Review of London of April 15, 1905, p. 295, and the reply of the Cook & Bernheimer Company in the issue of May 15, 1905, p. 425.)

I do not believe you indorsed that action or that you were even aware of it, because such efforts could benefit no one, except those distillers who have been attempting for some time to eliminate the wholesale dealer by bottling a straight distillate in bond and using the Government's receipt for the tax to misrepresent its purity and wholesomeness.

The law has provided for years that whisky in original distillers' packages can be exported free of duty, or with drawback of duty if duty has been previously paid.

Every effort was made to secure a foreign trade for what was known as straight whisky, but the foreigner would not have it, because of its large percentage of impurities and because of its unpalatableness. The foreign taste demanded a blend. No provision had been made, however, for the exportation of blends with a drawback of tax, and as distilled spirits had to be tax paid before they could be removed from the distillery premises or blended, Congress recognized the importance of amending the law, which was done by providing bonded manufacturing warehouses into which the spirits could be shipped and blended for export duty free.

The effect of the acts of the Chief of the Bureau of Chemistry, therefore, was to discredit this action on the part of Congress and to interfere with the business of those exporting blends in favor of those who might export whisky bottled in bond, and also to work against the Bureau of Manufactures of the Department of Commerce and Labor, which is organized to extend the foreign trade of the United States.

The statements made by the Chief of the Bureau of Chemistry in the article referred to would have carried no weight whatever, except for the fact that they were the utterances of a public official occupying such a position.

The efforts of the chief of this Bureau, therefore, in so far as the whisky subject is concerned, are not in accordance with historical truth, for the reasons heretofore stated; they are not in the interest of the Federal Government, because if he could succeed in so discrediting blends as to affect the public consumption of them, the drinking public would turn to some other light beverage, but never to the bottle-in-bond class, because of the impurities which it contains, which would ultimately vitally affect the revenues of the Government; they are certainly not in the interest of the drinking public, because of the wholesome character of that which he advocates as compared with that which he is using his office to discredit and condemn.

What is technically known as straight whisky consists approximately of one-half water and one-half ethyl alcohol, plus certain flavoring matters derived in part from extracts from the wood in which it has been stored, and in part from the oxidization of the higher alcohols, known as fusel oils.

The extracts from the wood give color, as well as help to flavor, but everything else, except the water and ethyl alcohol, amounts to less than fifty one-hundredths of 1 per cent of the whole. Should you extract the color, flavor, and fusel oils included in this fifty one-hundredths of 1 per cent, there would remain just the water and the ethyl alcohol, which is called, for commercial purposes, neutral spirits. It is in reality an uncolored and an unflavored whisky.

Ethyl alcohol acts as an anesthetic and leaves no such baleful effects as are produced by butyl and amyl alcohol, the chief of the fusel-oil series. These are of bacterial origin, and are usually the results of the efforts on the part of the distiller to secure the largest possible yield from a bushel of grain.

I take the liberty of inclosing you a few quotations bearing on the subject.

There are two ways in which the fusel oil can be oxidized, one is by putting the spirits containing the fusel oil into a charred package, and such fusel oil as comes in contact with the char will become oxidized; the other way is to separate the fusel oil from the ethyl alcohol by appropriate machinery, oxidize the fusel oil separately, and then put it back into the spirits. The latter way is a thorough way, and the former is not thorough, because with all the agitation to which the barrel may be subjected, all the fusel oil will not come in contact with the char.

Fusel oil diseases the brain, and is responsible for all of the evils which attend

whisky drinking, because in addition to diseasing the brain, it arouses all the malevolent passions, whereas ethyl alcohol only arouses the benevolent passions.

When a blender or wholesale dealer buys a straight distillate, he finds as a rule that it is rank in flavor and taste, because of the high proof and the presence of a large amount of tannic acid and unoxidized fusel oil, which can only be remedied by the addition of whisky which contains none of these impurities. This process was held by a British parliamentary commission not to be adulteration, but dilution, because the two spirits were as much the same as two glasses of water out of the same spring. It was likewise found that when the mixture was complete there was a decided improvement in the whole. What is thus added, therefore, is not something different, but something precisely the same, except as to flavor, and the result has always been and always will be called whisky.

What is popularly known as a blended or compounded whisky, therefore, consists approximately of one-half water and one-half ethyl alcohol, plus certain flavoring matters derived in part from extracts from wood and in part from the oxidization of fusel oils.

If there is any analytical difference between the so-called straight whisky and the so-called blended or compounded whisky the difference is in favor of the blended or compounded article, which invariably contains less tannic acid and less of the fusel oils, and if a distinction is to be drawn in the application of the term "whisky" as between the two products the blended or compounded article is better entitled to the exclusive use of the term than the straight distillate.

No useful purpose, therefore, can be served by the efforts and policy of your Bureau of Chemistry, and the only purpose that can be served by such policy, aside from the advantage which would accrue to the distillers who make a specialty of bottling whisky in bond, is the cause of notoriety and sensationalism.

As to whether a conflict shall be invited between State and Federal legislation on the pure food question is a matter for Congressional consideration, but there should be at least no further inflaming of the public mind by sensational and unscientific statements to promote such legislation.

Let whatever may be done be the result of calm, dispassionate conservatism.

A large part of the country is looking to you to control this.

Respectfully,

I received a reply. This reply was written by Doctor Wiley. My letter was referred to Doctor Wiley. The reply was dated November 1.

DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D. C., November 1, 1906.

MR. WARWICK M. HOUGH,
900-908 Rialto Building, St. Louis, Mo.

DEAR SIR: I acknowledge the receipt of your communication of the 17th instant, in which you inform me of what the Chief of the Bureau of Chemistry has done with respect to certain investigations which I authorized him to make pertaining to distilled spirits.

In reply I would state that the Chief of the Bureau of Chemistry has made a full, detailed report to me of all the observations which he has made under the authority mentioned above.

You also call my attention to the authority which has been given me by Congress to establish standards of purity for food products, in which work I am empowered to consult the foods standards committee of the Association of Official Agricultural Chemists and such other experts as I may deem necessary. I perhaps ought to remind you that you are entirely mistaken in saying that I have called no other food expert to my assistance. On the contrary, experts representing every branch of industry affected by the standards have been consulted freely and fully.

In view of the fact that you seem to be misinformed on this subject, I beg to quote the following statement made by Dr. William Frear, chairman of the committee on food standards, above referred to:

"The committee on pure-food standards, appointed by and in behalf of the Association of Official Agricultural Chemists, has from the beginning recognized the importance of consultation with other experts and has availed itself of every opportunity therefor. The committee's plan for consulting experts was early made known to the Secretary of Agriculture and approved by him. Every schedule of standards recommended has, before its final adoption by the committee, been most carefully brought to the attention of those interested in the production and sale of the foods concerned. It is the fixed practice of the committee to submit to the experts of the trade a tentative schedule as a basis of recommendation, and later a revision of the

tentative schedule embodying amendments made upon a more complete consideration of the case in the light of the representations made by producers and others. By correspondence, by publication through the medium of the press, especially of the technical press, and by personal hearings, every effort has been made to gain from the experts of the trade an expression of the facts and opinions that should be taken into consideration in reaching a final judgment upon matters of such importance. To encourage the personal conference of individuals and organizations interested in the manufacture and sale of the various food products the committee has held meetings not only in Washington, but in New York and Chicago.

"It has frequently occurred that the facts developed by such consultations of other experts has resulted in a material modification of the initial proposals made by the referees and other especially qualified experts, upon whose judgment the committee has primarily relied.

"It is clear, therefore, that in every instance before the proclamation of the standards in any schedule the experts of the trade concerned have had due notice of the current proceeding of the committee, cordial invitation to cooperate, and full opportunity for making their wishes upon any point known to the committee or directly to the Secretary of Agriculture."

You also state that the food standards which have been proclaimed by me under authority of Congress "have been rejected as inaccurate and impracticable by the National Association of State Dairy and Food Departments, an organization which comprises all of the State officials and their assistants who are engaged in enforcing the pure-food laws of the several States." I regret that you have been so thoroughly misinformed respecting the attitude of the National Association of State Dairy and Food Departments. The action which it has taken in all cases has been exactly the opposite of the one of which you speak. I have secured from the secretary of the National Association of State Dairy and Food Departments a transcript of the various actions taken by that association relating to food standards, which is as follows:

"The Fourth Annual Convention of the National Association of State Dairy and Food Departments held at Milwaukee, Wis., November 20-22, 1900, adopted the following resolution:

"*Resolved*, That inasmuch as questions are arising which must soon be determined by the dairy and food commissioners of the several States respecting the use of preservatives, and the physiological effects of various foods and preparations offered for sale to our citizens, and which are articles of common use, and inasmuch as the dairy and food commissioner of any State is not in position to take up the investigation of these important subjects, owing to lack of funds and the limited time which any dairy and food commissioner is likely to be in office, we request the Department of Agriculture at Washington to begin as soon as their conditions will warrant it, investigations into these matters, which shall determine the physiological characteristics of these preservatives in an authoritative way, and that the results of their investigation be published for the benefit and guidance of the dairy and food commissioners of the several States."

"Signed by F. J. H. Kracke, assistant commissioner of agriculture, New York; E. O. Grosvenor, State dairy and food commissioner, Michigan; John Hamilton, secretary of agriculture, Pennsylvania; A. H. Jones, State food commissioner, Illinois; H. C. Adams, State dairy and food commissioner, Wisconsin."

"At the same meeting a report on food standards was presented by Mr. E. N. Eaton, member of the food standard committee of the association, with a motion that the same be adopted as the standards of the association. The motion was lost, and Mr. John Hamilton, secretary of agriculture of Pennsylvania, in objecting to the motion, said:

"Mr. Hamilton. Adopted by this body? I think a paper of that kind, as far-reaching as it is, ought to have careful consideration, item by item. I think it might be accepted as a partial report of this committee and placed on the records, but to adopt it as the sense of this body is going further than I care to."

"At the fifth annual convention of the National Association of the State Dairy and Food Departments, held in Buffalo, N. Y., October 15-17, 1901, the resolution adopted at Milwaukee, 1900, requesting the Department of Agriculture at Washington to make investigations regarding the use of preservatives for the guidance of the dairy and food commissioners of the several States, was reaffirmed, Messrs. J. E. Blackburn, State dairy and food commissioner of Ohio; John Hamilton, secretary of agriculture, Pennsylvania; and J. B. Noble, dairy commissioner of Connecticut, being the committee on resolutions. At the same meeting a committee on food standards was appointed 'to confer with the Association of Official Agricultural Chemists.' The committee appointed consisted of E. N. Eaton, State analyst of Illinois; A. S. Mitchell, State analyst of Wisconsin; and William Frear, State analyst of Pennsylvania.

"At the sixth annual convention of the National Association of State Dairy and Food Departments, held at Portland, Oreg., July 9-14, 1902, the question of food standards was discussed at length in connection with a plan presented by Mr. E. N. Eaton to establish food standards in a convention to be called by the National Association of State Dairy and Food Departments to formulate a United States food pharmacopœia. Mr. R. E. Doolittle, then State analyst of Michigan, in discussing Mr. Eaton's plan, said: 'The Association of Official Agricultural Chemists is doing this line of work, and the association has appointed two committees. One of these committees has charge of standards, and standards only. * * * There was another committee appointed which is subdivided into twelve or fifteen different subdivisions or heads. This committee is to arrange methods of analyses for the different food products. * * * These committees are doing this work, and they are doing it very thoroughly.'

"The Portland convention continued its standard committee to confer with the Association of Official Agricultural Chemists.

"At the seventh annual convention of the National Association of State Dairy and Food Departments the subject of food standards was considered in connection with addresses on 'Food standards,' by Mr. E. E. N. Eaton, State analyst of Illinois; by M. A. Scovell, director and chemist of the Kentucky agricultural experiment station and food commissioner of Kentucky, and a member of the committee recommended by the Association of Official Agricultural Chemists and appointed by the Secretary of Agriculture under the act of Congress to formulate food standards, and by William Frear, vice-director and chemist of the Pennsylvania agricultural experiment station and chemist for the Pennsylvania state food commission and chairman of the national food standard committee. Mr. Eaton presented with his address a compilation of food standards which was not read, but ordered published with the proceedings of the convention. Mr. Eaton makes the following statement in the introduction to his compilation of standards published in the journal of proceedings of the St. Paul convention:

"The National Association of State Dairy and Food Departments has long recognized the necessity of fixed standards for food. One of the chief aims of the organization—introduced, indeed, in the call for its formation—was to unify, if possible, State food laws and rulings, which means little more than uniform standards and definitions. Papers were prepared, addresses were delivered at every convention upon this subject, and when it was learned that the Association of Official Chemists had appointed a committee to frame food standards, this association appointed a committee to confer with the organization, to offer aid, and urge the early completion of the work. As the work was still in embryonic condition in 1902 the committee was continued. Still the agricultural chemists could only report progress, not results. Then, as chairman of this committee on standards from this organization, and on the advice of several food commissioners, I prepared a set of food definitions and standards, tentative, it is true, but embodying the ideals of the food chemists and aimed to meet the needs of the State food commissioners."

This letter is rather lengthy, and unless the committee desire to hear it I will not read it all.

The CHAIRMAN. Skip the rest of it. You can summarize it if you please. It will go into the record.

Mr. HOUGH. The record will go in. This letter is quoting an extract from the secretary of the National Association of State Dairy and Food Departments, Mr. Allen, of Kentucky, to demonstrate that the action of the State food commissioners had been contrary to that which I had stated it was in the letter which I had first written. All of that will go in. He says:

The above official transcript shows that the information you received respecting the attitude of this association is entirely misleading. In this connection I desire to call your attention to the fact that standards so far recommended by the national standard committee and proclaimed by me under authority of Congress have been proclaimed as the standards of several of the State departments whose officials are empowered by law to adopt and fix standards, namely, the food commissioner of Maine, the food commissioner of Connecticut, the food commissioner of Illinois, and the food commissioner of Kentucky.

You further state that the Chief of the Bureau of Chemistry has been "engaged in advising the British public through contributions to trade journals to buy only bottled-in-bond whiskies," and refer to the Wine Trade Review of London, of April 15, 1905,

page 295. On referring to that article I find the following language: "We have in this country one infallible method of tracing the purity of a distilled beverage by means of the excise stamp. That method should be adopted everywhere. Any Englishman who wants to import pure American whisky can do so by seeing that each package is properly stamped by our internal revenue office. Why should not we be able to assure ourselves of the purity of a British whisky by the stamp?"

In the same article the word "purity," as applied to distilled liquors, is defined as follows: "By the word 'purity,' as applied to distilled spirits and beverages, I mean that they are true to name and are exactly what they are represented to be or what the consumer believes them to be. * * * Purity as applied to whisky, as I understand it, means a product obtained by the fermentation of cereals, the starch of which has been converted into sugar by the action of malt. * * * The distillate should contain the whole of the volatile matters, whatever their nature, which are converted (formed) during fermentation, except possibly some of those which come over at the very first or at the very last of the distillation."

I fail to see in the above quotations any disposition on the part of the Chief of this Department to advise the British public to buy only bottled-in-bond whiskies. I fail to find the expression "bottled in bond" anywhere in the article. I fail to see anything reprehensible in stating that the purity of a whisky, as defined in the article by the Chief Chemist, can be assured by buying it under the revenue stamp of our Government. This seems to be a plain statement of fact which hardly admits denial.

I am led to the conclusion, from a careful consideration of the charges made in your letter, that they are groundless; that they have been made under misapprehension, and without a full knowledge of the facts in the case.

Respectfully,

JAMES WILSON, *Secretary.*

To this letter I replied on November 17, 1905. That letter reads as follows:

NOVEMBER 17, 1905.

HON. JAMES WILSON,
Secretary of Agriculture, Washington, D. C.

DEAR SIR: Your letter of November 1 received and noted. By my letter to you of October 17 it was my purpose to call your attention to three things which it seemed the Chief of your Bureau of Chemistry was attempting to accomplish, and, if so, I respectfully submit, improperly. These were:

First. He was inducing you to establish "definitions," when the law under which you were acting did not authorize you to do so.

Second. He was attempting to establish a definition for whisky which was contrary to facts and common usage, and which was not in the interest of the Government or the public, but solely in the interest of the "bottled-in-bond" class.

Third. He was using his office to encourage and promote the sale of the so-called "bottled-in-bond" class, and to discredit other classes of whisky.

These were the main propositions.

Incidentally I called your attention to the fact that the standards which you had been led to promulgate by the Chief of your Bureau of Chemistry had not been regarded as satisfactory by the National Association of State Dairy and Food Departments, which organization proposes to establish definitions and standards for themselves.

In your reply you did not notice two of the principal things to which I called your attention; only incidentally adverted to the third, and devoted your letter almost exclusively to showing that you had consulted "other experts," and that your work in establishing standards had been indorsed by the National Association of State Dairy and Food Departments.

While I do not wish the main propositions befogged by a too extensive discussion of collateral issues, I will digress sufficiently to show you wherein you have been led into error. The language in the appropriation bill is, "to enable the Secretary of Agriculture, in collaboration with the Association of Official Agricultural Chemists and such other experts as he may deem necessary, to establish standards of purity for food products and to determine what are regarded as adulterations therein."

The Association of Official Agricultural Chemists appointed a food standards committee, and you have collaborated with this committee, and with no other food experts, so far as the public has been advised.

It is true that members of the Association of Official Agricultural Chemists who have constituted the food standards committee of that association have received suggestions from outside chemists, but in such respect they were acting as members of the Association of Official Agricultural Chemists with whom the Secretary of Agriculture was

collaborating, and there is nothing to indicate that the views of "other experts" which they may have culled in their peregrinations, have ever been presented to the Secretary of Agriculture as the views of such "other experts," so that the Secretary of Agriculture might have had an opportunity of determining for himself how far the views of the food standards committee of the Association of Official Agricultural Chemists should be modified by the views of the "other experts."

It so happened that the chief of your Bureau of Chemistry, who is a member of the Association of Official Agricultural Chemists, is also a member of the food standards committee of that association, and statements and opinions might not have been made to him by "other experts," which would have been freely made to the Secretary of Agriculture himself.

An expert usually wants to take and obtain credit for the knowledge which he himself possesses, and does not always care to educate another expert so that such other expert can take that credit to himself.

A gentleman who is in a position to know has just written me on this subject as follows:

"It is easily conceivable that experts representing business institutions would hesitate to state facts in a public meeting that would be freely given to the Secretary of Agriculture, where no fear of their being used in their own locality to the detriment of their business would exist.

"It is unquestionably true also that many chemists would hesitate to give an opinion adverse to that held by Professor Wiley, who controls the door to employment in the chemical division of the United States Department of Agriculture."

I think it is clear that the consultation with "other experts" by members of the Association of Official Agricultural Chemists is not such "collaboration" with such "other experts" by the Secretary of Agriculture, as was contemplated by the act of Congress making the appropriation.

It was never intended that the opinions of "other experts" should be so "filtered" through members of the National Association of Official Agricultural Chemists to the Secretary of Agriculture as that the Secretary of Agriculture should not be in a position to recognize and give credit to such opinions.

The excerpt from the letter of Dr. William Frear, chairman of the committee on food standards of the National Association of Official Agricultural Chemists, which you quote, merely confirms what I have heretofore said.

You next quote at length from a statement which you say you "have secured from the secretary of the National Association of State Dairy and Food Departments" with respect to various actions taken by that association relating to food standards, which statement you refer to as an "official transcript."

On this subject I can with propriety quote to you your own words:

"I regret that you have been so thoroughly misinformed respecting the attitude of the National Association of State Dairy and Food Departments."

Instead of the extract which you have quoted being an official transcript it appears that it is nothing more than a statement by the secretary of that association of his personal views, which he attempts to support by what I am informed are garbled extracts from the record. Such examination of the record of the official proceedings of that association as I have been able to make, do not disclose the facts as they appear in his statement, and on this point I quote you from a letter which I have just received from a gentleman who is in a position to know:

"I herewith show you that the statements of Secretary Allen are absolutely false, unreliable, and misleading in almost every particular, and are also contemptible, in that he quotes only parts of statements which will suit his own views and does not give the facts as I am now doing and of which you have absolute confirmatory proof by the official proceedings of the various conventions to rely on."

Mr. LAMB. Who is that from?

Mr. HOUGH. That is from Mr. Meyers, the publisher of the proceedings. He had all of the proceedings and I did not have them, and of course Doctor Wiley did not know anything about it, either. He simply accepted the statement of Secretary Allen as to what was done. (Reading:)

It is not necessary at this time and in this letter to quote you at length the proofs which were given me in support of this statement. Suffice it to say that my statement as to the attitude of the National Association of State Dairy and Food Departments was based upon the action taken by that association at its last annual convention, and it was hardly proper for you to quote me, even had such quotations been correct, what action had been taken by that association at previous conventions.

This association at its last convention adopted the following resolution: "*Be it resolved*, That this association request its standards committee to use due diligence in the preparation of a set of standards and definitions for the use of this association, and to report on said standards and definitions at the earliest possible opportunity," and appointed a permanent standards committee after various criticisms of the agricultural standards.

If you will get a copy of the Morning Oregonian of Saturday, July 15, 1905, which was published at Portland, Oreg., you will find a two-column article with the following large headlines: "Adopts a new food standard—Department of Agriculture regulations are called impracticable," the opening paragraph of which article is as follows:

"Yesterday morning the most notable event in the history of the National Association of State Dairy and Food Departments took place."

I quoted from this because the proceedings had not been published, although extracts from the proceedings had been sent to me. when I sent the letter to see if the extracts from the letter of the Secretary had been properly quoted.

I continue to read from this article:

Yesterday morning the most notable event in the history of the National Association of State Dairy and Food Departments took place, when at the last day's session of the annual convention held in the auditorium at the exposition it was unanimously voted to formulate food standards for the association, in utter disregard of the standards of the Department of Agriculture, which heretofore have dominated. This is the most remarkable move that has ever been made in the fight for pure food, as it means the separation of the State and Government interests, which have worked to perfect food standards since the inception of the National Association of State Dairy and Food Departments, ten years ago. The food standards have always been recognized.

Last year an attempt was made at the convention held in St. Louis to adopt certain food standards foreign to those of the Department of Agriculture, but the Government forces were too strong, and the resolution presented for that purpose failed to pass.

The adoption of new food standards by the National Association of State Dairy and Food Departments is an open criticism of those of the Department of Agriculture, and can not be interpreted in any other way.

The members of the association, many of them in Portland attending the convention, are among the foremost chemists in the United States, are not satisfied with the methods of the Department of Agriculture pertaining to pure food, and believe they can accomplish more by striving as a separate body not hampered by the Government officials.

It might be well, however, to call your attention to the fact that this association did not, at its convention held in St. Louis, indorse the standards of the Agricultural Department, but the resolution which was adopted was so cunningly and adroitly worded as to state, what was not a fact, that the association at its previous convention in St. Paul had done so, whereas the resolution at the St. Paul convention was evidently adopted before the promulgation of any standards by you, and merely proposed to adopt them when promulgated. How a convention can be said to indorse something which has not been done is beyond explanation, further than that which was given to me, to wit, that the adoption of these resolutions was brought about through the paramount "influence" of the Chief of your Bureau of Chemistry. A part of the nature of this "influence" can be appreciated when you learn that the secretary of that association, whose statements you so copiously quote, was an applicant for a position under the Chief of your Bureau of Chemistry, and only withdrew his application after the recent exposure of his connection with bottled-in-bond whisky.

I will state in this connection that I am informed that the application has not been withdrawn.

Doctor WILEY. There never was an application, Mr. Chairman. He never made any such application.

Mr. HOUGH. I know the record shows that he took two civil-service examinations for the position, and it was commonly stated that he was an applicant, and if it is material to show that, there are letters to prove that he stated that he was promised a position. I will state in

fairness to Doctor Wiley that he told me that he had not promised him a position, but—

Doctor WILEY. I told you that he had applied for a position?

Mr. HOUGH. That he had applied, or expected to apply, but that you had not promised him a position. The records of the Civil Service Bureau will show that he was an applicant and took the examination for the position in the Department.

Doctor WILEY. It is quite a different thing for a man to apply for an examination before the Civil Service Commission, and for him to apply for a position in the Agricultural Department. Mr. Allen has never applied for a position in the Department.

Mr. HOUGH. I am informed that he has made application for it.

Doctor WILEY. I only rise, Mr. Chairman, because Mr. Allen is not here, and I do not like to see a man misrepresented in his absence.

Mr. HOUGH. A copy of that was sent to Mr. Allen, was it not?

Doctor WILEY. A copy of what?

Mr. HOUGH. The statement has been made by Mr. Allen that he was an applicant, and he does not deny that he wants the position, and he has given an explanation in a letter as to why he wants it.

Mr. LAMB. I do not see the relevancy of it.

Mr. HOUGH. In this letter?

Mr. LAMB. Yes.

Mr. HOUGH. The Secretary of Agriculture in writing me this letter, or rather the Chief of the Bureau of Chemistry, because Doctor Wiley wrote the letter, quotes from a letter of Secretary Allen to show that I am mistaken as to the attitude of the association—and I want the Secretary to understand—and then the people to whom I refer the matter, who hold the records, say that he did not state all the facts; that he only took out parts of the facts to sustain the position that the national association had taken a position other than that which I was informed it had taken.

Mr. LAMB. You want to show that Mr. Allen is susceptible to undue influence?

Mr. HOUGH. No, sir; I wanted to show why he was biased. The statement was made that he had not given all the records, and I wanted to show why he was biased and was trying to make all out of the record that he could get out of it, and to show that my attitude in regard to the association was incorrect. I do not claim to be correct. I just want it to be understood that that is what the records, as I have them, show. [Reading:]

I am also informed that you are mistaken in thinking that the standards so far promulgated by you have been proclaimed as the standards of all of the States which you name.

I am informed that they have merely been printed in the Department circulars to show the difference, wherever it may occur, between the standards promulgated by you and the standards used in practice by the States.

I regret that I have been compelled to digress thus far, but my investigation leads me to believe that it is you, and not I, who have been so thoroughly misinformed.

But to return to our original propositions.

If you were as well informed as the Chief of the Bureau of Chemistry on the subject of bottled-in-bond whisky you would appreciate the fact that it is not necessary to use the words "bottled in bond" in order to signify or mean "bottled in bond."

The only American whisky in bottles which is stamped under our internal-revenue laws is that which is known as "bottled in bond," and when he stated in his article in the English journal that pure American whisky can be bought by seeing that each package is properly stamped by our Internal-Revenue Office he can refer

only to "bottled-in-bond" whisky, and is therefore officially promoting the sale of "bottled-in-bond" whisky.

Moreover, his definition of the word "purity" is most reprehensible and misleading. It is contrary to the definition of the term as used in our internal-revenue laws; it is contrary to the definition of the term as used in works and treatises on distillation; it is contrary to the definition of the term as used in the British departmental investigation, and as used by the experts who testified at that hearing, and it is contrary to the common acceptance of the term.

Was it not intended to be misleading in the interest of that kind of whisky, and those who make a specialty of it?

If it was not, why should that word be used in that sense by him when there are other words better understood by the public, and more appropriate as indicating that to which he says he referred?

If the word "pure" is the proper term to apply to that class of whisky to which he referred, then the word is incorrectly used in the United States internal-revenue laws, as applied to that whisky which is "freed from impurities."

If the class of whisky to which the Chief of the Bureau of Chemistry refers is "pure" whisky, then it follows that all other whisky must be regarded as impure.

If it was the purpose of the Chief of your Bureau of Chemistry to appropriate this word for the exclusive benefit of bottled-in-bond whisky, of what significance is the reference in the law to the purification of whisky after distillation?

But even with the strained and unnatural meaning in which he says he uses the term, it is, by his own limitations, improperly applied to that class of whisky the sale of which he seems to be so strenuously engaged in promoting, because whisky of the "bottled-in-bond" class contains more of those volatile matters created during fermentation, and which come over at the first and the last of the distillation, than are either wholesome or healthy, and more than he has said they should contain; and, since they contain them, such spirits are not entitled to be called "pure," even within the strained meaning of the term as explained by him.

This, however, is not the most serious of all the "scientific pleasantries" in which the Chief of the Bureau of Chemistry indulges.

We know that what has passed into history as the celebrated "Wiley-Bee-Lie," though of full legal age, has never been overtaken or downed; we know that the trail of trade damage to the bee keepers of the nation from a statement made by the present Chief of the Bureau of Chemistry in 1881, and which was subsequently termed by him a "scientific pleasantry" has continued to this day.

I do not wish to see history repeat itself with reference to the "scientific pleasantries" which have been indulged in during the past year by the Chief of the Bureau of Chemistry on the subject of whisky, and the only way to treat these "scientific pleasantries" is to throttle them in their chrysalitic stage, before they have had an opportunity of becoming full fledged.

As was very aptly said by the American Bee Journal in its issue of June 14, 1882: "Do scientific men indulge in pleasantries which will cast a gloom over thousands of honest producers throughout the country, depreciating the value of their product by creating a prejudice against it? For nearly a year this 'scientific joker' saw his fabrication published in nearly all the papers of the country and reiterated from across the ocean, and yet he lacked the manhood to affirm it a joke until the Bee Journal man counteracted its influence by showing the falsity and absurdity of the article. * * * Could any possible good result to society at large from such reckless assertions there might be some palliation, but when the only justification which can be urged is that it was intended as a 'scientific pleasantry,' it leaves the author but little to congratulate himself upon, even though he has succeeded in disgusting the world.

"H. W. Wiley (late Riley) has earned for himself a posthumous reputation, which will stand second only to that of his illustrious prototype, Ananias."

Mr. LAMB. Who wrote that?

Mr. HOUGH. That was published in the Bee-Keepers' Journal.

Mr. LAMB. That is a little beyond pleasantry.

Mr. HOUGH. Yes, sir; that is pretty strong.

Mr. HENRY. Is that relevant in the matter before us?

Mr. HOUGH. I said that in this protest which I filed with the Secretary of Agriculture—it was an argument on one part of this argument which I was making about the power which the Bureau of Chemistry has to establish standards and to publish details, and it also had to do

with the establishment of definitions and standards as applied particularly to whisky, and most of it was on that point.

Now, when I wrote this letter to the Secretary of Agriculture I made this quotation from the Bee-Keepers' Journal, and I made this explanation:

I do not mean to subscribe to all which is said in the criticism which I have quoted, and I quote it only for the purpose of showing that while the "Bee Journal man" thought in 1882 he had counteracted the influence of the statement which he meant to criticise, it developed at the national convention of the Bee-Keepers' Association, which was held on the grounds of the St. Louis exposition last year, that he had not succeeded as he thought because the explanation of the joker that the statement was meant for a "scientific pleasantry," has never been able to overtake the original statement, which is even to-day repeated as an actual fact by periodicals and newspapers, which took the original statement from the Popular Science Monthly for June, 1881, but never saw the correction and explanation which was published in such an out-of-the-way corner as the Indiana Farmer and the Bee-Keepers' Journal.

For this reason I wish to leave no stone unturned to thoroughly exploit the "scientific pleasantries" indulged in by the chief of the Bureau of Chemistry in making the statement which he did in reference to the percentage of adulterated whisky in this country.

Mr. BROOKS. You are reading from your own letter?

Mr. HOUGH. Yes, sir.

Mr. BROOKS. And you want to get this matter about the Bee-Keepers' Journal in this record?

Mr. HOUGH. No, sir; I do not care to have it in the record.

Mr. BROOKS. Is that a part of your communication to the Secretary of Agriculture?

Mr. HOUGH. That is a part of the record. I have no ulterior motive, Mr. Chairman, in reading this. I do not care to have it go in the record.

Doctor WILEY. I should like to have that go in the record.

The CHAIRMAN. Just finish that, and we will take it up later.

Mr. HOUGH (reading):

For this reason I wish to leave no stone unturned to thoroughly exploit the "scientific pleasantries" indulged in by the Chief of the Bureau of Chemistry in making the statement which he did in reference to the percentage of adulterated whisky in this country. The necessity for doing this is accentuated by the joke which he now proposes to perpetrate in the matter of the establishment of a definition for whisky.

I called your attention particularly to the fact that while you have no authority to establish definitions the Chief of your Bureau of Chemistry is attempting to establish a definition for whisky which is subversive of all common knowledge and the history of the subject.

I have taken the matter seriously and given you at great length the reasons why the Chief of the Bureau of Chemistry is wrong, and the only reference you made in reply was that the "charges" made in my letter were groundless. I hope they are, upon this point especially, though I had not meant the information which I conveyed to you to be dignified by such a term.

May the whisky men of the country rely upon you to check this tendency on the part of the Chief of the Bureau of Chemistry to indulge in "scientific pleasantries?"

No doubt much of what he does in the line of sensationalism is intended to raise the public to his conception of the necessity for pure-food legislation. But, as was appropriately said at the bee keepers' convention on this subject last year:

"Sometimes it seems that a little exaggeration of the adulteration of food is not an unmixed evil, as the public will awaken to the importance of protecting themselves; yet truth is the better guide, especially where falsehood injures large industries as it has in honey, candy, flour, and other food stuffs."

Respectfully,

WARWICK M. HOUGH.

On December 4, 1905, some time after the receipt of the other letter, I received an acknowledgment of my letter, which reads as follows:

DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D. C., December 4, 1905

Mr. WARWICK M. HOUGH,
900-908 Rialto Building, St. Louis, Mo.

DEAR SIR: I acknowledge the receipt of your communication of the 17th ultimo in relation to the standards of purity proposed, or to be proposed, for distilled liquors.

The statements contained in your communication will receive due consideration.

Respectfully,

JAMES WILSON, *Secretary.*

Mr. ADAMS. Let me ask you just one question. Is not this your principal contention, that you want to put on the market a blended whisky and label it "whisky" without being compelled to label it exactly what it is?

Mr. HOUGH. No, sir; it is not. This is a slight digression from what I want to call the attention of the committee to, but on that point I would like to say something. I will not take long, but I must answer that.

I stated two years ago before the manufacturers' committee that the blended or compounded article has a better right to the unlimited and unqualified appellation of "whisky" than any other article that is made; but since the Bureau of Chemistry had made such a fuss about it and had said there must be a distinction made and that the other class had the better right to that name, thus endeavoring to rob the blended or compounded article of its birthright, and to confer it upon some other article that had not any title to it, we did state that we would not object to stating that the article was blended or compounded if it was so in fact.

We did not want to oppose pure-food legislation, and I have pleaded at every meeting that an amendment be put in the bill requiring only such a statement, so that we might be excluded from the pure-food proposition. At that time Doctor Wiley indorsed these amendments, and he said that they sufficiently met the objections of the Bureau of Chemistry and the requirements of a pure-food bill. There was a provision in the bill that whisky should contain nothing deleterious, or injurious, or poisonous to health, which we agreed to, and then we agreed to give up the right, to which we were entitled by the history of the subject, to apply to our product the unqualified term "whisky." And when I say "our product," I do not refer to blended whisky alone, but all whisky. I represent nine-tenths of all the blended whisky interests in the country and also nine-tenths of the straight whisky interests in the United States. There is only a small interest that is trying to accomplish a certain purpose in this matter.

As I say, we were willing that that requirement should be made. What more could be demanded on that subject?

Mr. ADAMS. What more is demanded?

Mr. HOUGH. Certain interests that were instrumental in framing the pure-food bill thought that we were not willing to use the word "blended." They thought it was a stigma, and we would not accept it; but I said, "We will accept it, and we will tell the country the truth about it, and we will tell them that that blended whisky is the only pure and real and original whisky, and that the so-called straight

article has been imitating the blended whisky, instead of the blended whisky imitating the straight whisky.

But when we said that we would accept that, then it did not suit somebody, and they wanted to require the ingredients on the label. I said to Senator Heyburn, "Require that of all whisky, and it will be fair."

Mr. ADAMS. There might be something added besides water.

Mr. HOUGH. It does not make any difference what is added, provided that there is a statement required of the ingredients so that it will show by analytical test; but you must require that also of "bottled in bond" whisky. And there is not a word in the pure-food bill that requires an analysis or any inspection of the "bottled in bond" whisky, and I am told there is nothing that touches the baking powders made by the trusts.

There was a long article in a Chicago paper last year on this, and there has been a great deal said about this pure-food bill; but I do not care to go into that now, because I am going into it fully next week before the Interstate Commerce Committee of the House of Representatives, and I have only gotten started on the importers' proposition, which I meant to lead up to. But I say that this committee should not anticipate the action on the pure-food law by giving authority to the Bureau of Chemistry of the Agricultural Department to do just what the Senate has objected to in every pure-food bill, and that is to establish definitions and standards.

They say there is nothing in the pure-food bill to establish anything in the way of definitions and standards. It is not necessary, so long as this authority is given here; and if it is here, it is just as bad as if it was in the pure-food bill; it is bad because it establishes a practical dictatorship on all pure-food products in the United States. That is un-American, and it is unfair.

I have a specific case in my own experience with reference to this last provision, which applies to importers.

The CHAIRMAN. It is after 12 o'clock, and members of the committee will have to go up on the floor of the House.

Mr. HOUGH. I can finish in a very few minutes, Mr. Chairman.

The CHAIRMAN. Do you want to be heard before the committee, Doctor Wiley?

Doctor WILEY. That depends on whether the committee would like to hear me or not.

The CHAIRMAN. The committee would like to hear you. Do you want to be heard?

Doctor WILEY. If the committee thinks any of these statements here are true I would like to have a say, of course. If the committee does not I do not care to be heard.

Mr. LAMB. No, sir; the committee wants light. I will tell you that, now.

(After informal discussion the committee adjourned until 1.30 o'clock p. m.)

AFTER RECESS.

The committee met, pursuant to adjournment, at 1.30 o'clock p. m., Hon. James W. Wadsworth (chairman), in the chair.

STATEMENT OF MR. WARWICK M. HOUGH—Continued.

The CHAIRMAN. Have you covered everything down to the clause affecting foreign goods, that you wish to discuss?

Mr. HOUGH. Yes, sir; practically. I do not think the power to establish standards should be continued. That is the power which has been chiefly objected to, because they are arbitrary powers, very arbitrary as they have been exercised, and the standards as they have been adopted so far have been rejected, as I have attempted to show from the correspondence on the subject, by the food chemists of the respective States who have a practical knowledge in addition to a theoretical knowledge on the subject.

The general phraseology of this bill "which are dangerous to the health of the people of the United States," I think sufficiently covers it.

The CHAIRMAN. Right there, along the line of the conversation I had with you, I would like to ask you about this board you speak of. What is the title of it?

Mr. HOUGH. The National Association of Official Agricultural Chemists.

The CHAIRMAN. Yes. Now, they can standardize, but that is not effective until the State makes it so by law?

Mr. HOUGH. It is not as to the State, but it is so as to imports.

The CHAIRMAN. That is a different proposition, because the United States must deal with imports directly. The States can not deal with imports. So that if there is a difference of opinion on that, the States need not adopt that standardization and make it a legal standardization.

Mr. HOUGH. That is true, except then you have two legal standards in the United States, and if the question should come up in a court you would have those two standards, and the question would be whether they would adopt the standard of the State or the standard of the Department of Agriculture.

The CHAIRMAN. In the United States courts?

Mr. HOUGH. Yes, sir.

The CHAIRMAN. I should not think there would be any doubt as to which they would adopt.

Mr. HOUGH. Of course any pure-food bill would be effective.

Mr. HASKINS. How can you get up in the United States courts the questions involving the constitutionality of a State enactment?

Mr. HOUGH. You could not. The question is as to the correctness of the two standards. If the State chemists, in the practical work in the field, who add their practical knowledge to their scientific knowledge, are disposed to think that many of these standards adopted by the Bureau of Chemistry are improper—

Mr. HASKINS. That is a matter of fact, and not of law.

Mr. HOUGH. That is a matter of fact. But when you come to enforce a Federal pure food bill in a Federal court they may not follow the standards laid down by the food chemists of the State, and they

will follow this national standard. That is just the thing that they seek to avoid by the establishment of a pure-food law having any definite standards.

The CHAIRMAN. How would you arrive at a way to settle these disputes?

Mr. HOUGH. Leave it just as the provisions in the bill are, if any bill of that kind is to be passed, and let anything as to the States be controlled by the standards of the States.

Mr. HASKINS. What State has announced the United States standards impracticable?

Mr. HOUGH. No State has announced anything on the subject. The National State Dairy and Food Products Association, which is composed of the food officials of the respective States and the food chemists of the respective States, have in convention assembled decided that the standards adopted by the Bureau of Chemistry are not practicable. And they have appointed a standards committee of their own, which standards committee meets in Chicago. I think, next week, to adopt standards which each of the members of the association is supposed to be obligated to have established by his own State. That is one thing that Doctor Wiley does not want done.

Mr. HASKINS. Have you the action with you of the association, or anything of the kind?

Mr. HOUGH. I read it this morning.

Mr. HASKINS. That is the only question?

Mr. HOUGH. That is a copy of the resolution which was adopted, and as I said, I read from the newspaper account of what took place at the convention, because the proceedings are not printed. I have seen a copy of the proceedings, and it confirmed what was stated in the letter on that subject.

Now, when you come to apply those arbitrary standards to imports, of course it is just as bad, so far as the importer is concerned, as it would be for a manufacturer in this country who would be subject to the provisions of the Federal pure-food bill. The Department first took the position, as I understand it, that nothing containing preservatives, sulphurous acid, or potassium sulphates, could come into the country at all.

Now, the Department has changed its attitude in that respect after it was demonstrated, I think, by different chemists that copper sulphate is not a poison. Our grandmothers used to boil the peas in a copper kettle in order to get a little copper sulphate to preserve them over the winter. And the salicylic acid is not a poison. I am not so much interested, you understand, in that part of the question; but naturally I learn something about this by observing and being in touch with it.

All Rhine wines have sulphurous acid in them. I was present at a meeting of the chemical society in New York last April when the professor of physiological chemistry at Columbia University demonstrated in the simplest, easiest, most graceful manner, that Doctor Wiley was entirely wrong with regard to his previous utterances in regard to sulphurous acid, and it was there stated also that while Doctor Wiley was saying that copper sulphate was a great poison, and would kill everybody, another division of the Agricultural Department was saying it was beneficial to health; and I think Doctor Wiley's statement in reply was that he represented Congress and the other departments did not represent Congress. In other words, that he being

empowered, I suppose by such provisions as this we are discussing, had a right to say something which must be accepted as a fact, whereas the others, not being so empowered, had no right to say what was a fact.

But there are two chemists in the Agricultural Department disagreeing as to a very material fact, which has a material bearing on the rights of the manufacturers who may use copper sulphate as a preservative. I do not know—I have no knowledge—as to what manufacturers use it, except I suppose that canners use it.

Now, coming to the importers' clause, the importers say that practically the provisions of the pure-food bill should not be made to apply to them in advance of its being made to apply to the home product, except in cases where the article imported is unquestionably dangerous to the health of the people of the United States, and that fact ought not to depend entirely on the opinion of one chemist, or the chemist of the Bureau of Chemistry of the Agricultural Department.

I have had sent to me a number of instances where goods have been sent back merely because they contained an amount of sulphurous acid—acting upon the instructions of this Department—an amount of sulphurous acid which now is admitted not to be dangerous to the health of the people of the United States. That was a damage to the people who had their goods sent back, and there was no appeal from the decision of the Bureau of Chemistry. The position was also taken by the Bureau of Chemistry that anything which was colored must have the words "artificial coloring" on it.

Every distilled spirit, whether it is a whisky or a brandy or a liqueur, which has any color at all is artificially colored. But after the ukase of the Department of Chemistry that it could contain no aniline color, because coal-tar colors were prohibited by that Department, they tried to get vegetable colors. But vegetable coloring has spoiled largely the taste of those things, and aniline color is not dangerous to health if it is there in small quantities only, such small quantities as are necessary to hold the color.

An importer of New York who had the temerity some time ago to criticise the methods of the Department of Chemistry has lately, it seems, been subjected to a great deal of trouble by having his importations held up, first on one ground and then on another, and that importer was here with me the other day, but had to go back or he would have appeared with me. I am sorry that he had to go back to attend to another matter. I protested to the Department of Agriculture against that action. I said:

There is nothing in it that is detrimental to the health of the people of the United States. It is colored as it has always been colored, and no one ever heard of anyone taking a small quantity of creme de menthe after a meal ever being killed or injuriously affected in any way.

It seemed that the article came correctly labeled as to the fact that it was artificially colored; they complied with the ruling, and they had on the label "artificially colored." Then there was another label at the top which said "vegetable coloring." The chemist—who had passed many cases of these same goods from the same house and similarly labeled and colored with the same color and declared that they were not coal-tar coloring, since there was a dictum against the coal-tar coloring after this man criticised the Bureau of Chemistry—found that

it was full of coal-tar coloring—aniline—that is coal tar instead of vegetable coloring, and those goods were seized.

The position was then taken that the coal-tar coloring was not there in sufficient quantities to be dangerous to the health of the people of the United States, and the chemist of the department in New York admitted that that was so; but he said: "We will now hold it on the ground that it is falsely labeled as to contents, because it says that it is vegetable coloring, and we find that it is coal-tar coloring."

Now, here is a firm that does a large importing business, and their shipment is tied up because of this technical question about which chemists disagree. My client has cabled to the house in Bordeaux and they have cabled back that it contains only vegetable coloring, and propose to send an affidavit of the American consul there to show that this is the same coloring that they bought and with which they colored all the other goods, and say that they do not want the goods sent back. But in the meantime this man can not distribute his goods on account of a purely technical question. That shows how the provisions of the pure-food bill would be enforced, and the provisions of the pure-food bill give more extensive powers, I think, than the provisions of this bill.

I wrote to the Department of Agriculture for an opportunity to be heard by it, and I got a letter from Doctor Wiley saying that he did not know that I represented these people before the Department. That was an improper position for Doctor Wiley to take. I am an attorney in St. Louis. I write on my letter heads. I write to the Department in the same way as I write to everybody in matters coming before me. But he evidently did not want to accord me a hearing in that matter as to whether that was a proper detention.

In the mean time the business of that man is at a standstill, and he can not go ahead. He had criticised Doctor Wiley. In the first place, I say, it is not the fault of the importer here, and it is not the fault of the exporter there in Bordeaux. He sends over these goods colored with the same coloring matter that he has used often. This is a mere technical distinction, perhaps. It may be that there is such a close resemblance to aniline colors in some vegetable colors that you can not distinguish the difference. I have been told by some chemists that this is so—that some vegetable colors will color a cloth and will respond to the tests for aniline colors.

The last telegram on the subject came yesterday. It is as follows:

Following cable just received from Nuyens, Bordeaux:

"By post you will receive affidavit. American consul cabled to-day directly to Doctor Wiley, Washington, as follows: Suspend action; shipment creme de menthe from Nuyens, Bordeaux, until papers reach you. Signed, Nuyens.

"P. W. ENGS & SONS."

In the former telegram it shows that he is going to say that the coloring he bought is the same coloring he has always used, and which was the best. That shows the danger of having such powers in the hands of one man without any chance to review it. A man's business can be ruined while the question is being discussed, and the importers of New York have tried to stand what they consider a great many hardships, and they think it is time now to make a protest against the arbitrary action of the Department in respect to the law in these details that really do not amount to much, so far as health is concerned,

but which will create conditions which are prejudicial to people in the United States.

Mr. LEVER. Your plan is to create a board of review?

Mr. HOUGH. Yes, sir; if you continue that power; to create a board of review, of chemists outside, and let them pass on it.

The CHAIRMAN. Even then if an individual had a decision rendered against him he would have a grievance, and we would have to create another board to review their action, and so on ad infinitum.

Mr. HOUGH. But ought you to leave the power in the hands of one man to absolutely ruin a man's business on a technicality like that?

The CHAIRMAN. No; you are absolutely right on that.

Mr. HOUGH. His customers can not get this crème de menthe. He has ordered it for his customers, and they can not get it.

The CHAIRMAN. I suppose what you refer to is this language:

Giving notice to the owner or the consignee of the sampling of such articles, and the owner or consignee may, after notification, have the right to introduce testimony before the Secretary of Agriculture, or his representative, either in person or by proxy, concerning the suitability of such articles for entry.

That is a proposed amendment this year. Does not that cover that point?

Mr. HOUGH. Not entirely, because the Secretary of Agriculture would naturally take the opinion of the Bureau of Chemistry.

Now, take a sample case. I wrote in conformity with that provision and asked for a hearing, and it was not met in a fair, frank manner at all. Here is the letter that I got, written by Doctor Wiley, dated January 31, which did not reach me until yesterday, because I was not in St. Louis. I got it after I returned here. It says:

I have your request of the 25th instant to appear before me to submit argument in the case of an importation of green creme de menthe covered by entry No. 6833, of January 8, 1906, consigned to P. W. Engs & Sons. You failed to give in your request the authority of P. W. Engs & Sons to represent them in this case. I suppose that was a mere omission, but it does not seem from your letter that you appear by their request and as their representative.

That seems to me like a mere equivocation.

Mr. ADAMS. Let me ask you a question or two. You do not contend that there has been any violation of the law by the Department in these proceedings?

Mr. HOUGH. In which?

Mr. ADAMS. In these proceedings you describe.

Mr. HOUGH. No, sir. I say that the action of the Department has been arbitrary. The exercise of the power conferred by the provisions of this bill has been arbitrary, and that power has been exercised in the light of arbitrary standards which do not meet the approval of the majority of chemists and expert men in the United States on that subject. That is the position I take.

Mr. ADAMS. You claim that you have no remedy in the courts whatever?

Mr. HOUGH. What good does it do, if you please, to find out at the end of three years that we were right, when our business three years ago was ruined?

Mr. ADAMS. It would do you this much good: In the first place, it would not take you three years to get a decision by the courts; and in the second place, if it was in your favor the Department would be discredited. It would have that effect.

Mr. HOUGH. It would have that effect. But I have made internal-revenue law my specialty ever since I was assistant United States Attorney in St. Louis, sixteen or seventeen years ago. My attention was attracted then to similar cases coming up in this way, and the dealers and people who have to do with the inspectors will stand almost anything rather than go into court. They will let their property be taken, or let it be shipped back to the place from which it came, or let it be thrown away—anything to avoid the trouble and expense necessary to stand for an abstract principle, largely, of right. This is a shipment of no great value, of course. It is only worth, probably, \$200 or \$300.

Mr. ADAMS. Has it occurred to you that importations misbranded, and which may be injurious to public health, very seriously affect the people, and in the enforcement of any law there will be inevitable hardships?

Mr. HOUGH. Yes, sir; but I would so hedge it about as to protect the rights of the individual as well as the rights of the people who are to consume, that no hardship can be worked under the law, or so that it is not possible for a single individual to assume an arbitrary, autocratic position.

The CHAIRMAN. You do not assume the position that it ought to be abandoned?

Mr. HOUGH. No, sir; I think it is a good thing. I do not think anything ought to come into the country which is deleterious to the health of the people of the United States. I think if that law is properly enforced it is a good thing. But when a shipment is stopped on a technical question like that, when even the fact is conceded that it is not detrimental to the people of the United States, then I say that the law is being perverted and is not being enforced according to its spirit; and when you find that, the power should be taken away entirely or hedged about with such safeguards as will prevent any such arbitrary action as that.

Mr. LEVER. Your protest is not against the power in the bill, but against the use of the power by the Bureau of Chemistry?

Mr. HOUGH. It is a protest against an unlimited and unrestricted power.

Mr. LEVER. Has the Bureau of Chemistry gone beyond the law in imposing hardships on these people?

Mr. HOUGH. Undoubtedly, if they have construed the law so that it makes it a whit narrower than the language used in the law they have gone beyond their power. They have a right to stop a shipment dangerous to the health of the people of the United States, but when they use that power to stop something that is admittedly not dangerous to the people of the United States, solely because instead of one kind of coloring matter it contains another kind of coloring matter, that is a technicality, and it is using the law to do something else than enforce its provisions, according to the spirit.

Mr. FIELD. You regard it as a technical enforcement of the law when this particular product you speak of is stopped, being improperly branded, and the coloring, instead of being a vegetable coloring, was a coal-tar preparation. Do you claim that to prevent that being sold would be merely the prevention of a technical violation of the law, because, perhaps, this coal-tar substance was in such small quantity as not to be deleterious to the health?

Mr. HOUGH. If what is there does not make the article dangerous to the health of the people of the United States.

Mr. FIELD. How could they enforce the law in such a case if the law prohibits the matter being a coal-tar preparation?

Mr. HOUGH. But it does not.

Mr. FIELD. It says it shall be branded—

Mr. HOUGH. It says "falsely branded as to contents." It is not falsely branded as to contents.

Mr. FIELD. This was a false brand, was it not?

Mr. HOUGH. If it was not a vegetable coloring it would be falsely branded as to the coloring matter. But if it is branded *creme de menthe* and is *creme de menthe*—

Mr. FIELD. I understood you to say that it was branded vegetable coloring when it was not?

Mr. HOUGH. No, sir; it is branded "*creme de menthe, artificially colored.*" It says "*creme de menthe, artificially colored.*" The law does not say a false statement as to any fact about it. The law does not say a false statement as to any ingredient, but a false statement as to the contents. The "*contents*" is certainly not coloring matter; it is *creme de menthe*. And that that is a correct construction of this matter is practically admitted by the terms of the Heyburn bill, which says "*falsely branded as to contents or any ingredient.*"

Now, if this language does not cover any ingredients, it covers, we will assume, a misstatement of fact. It seems in this case there is no intentional misstatement of any fact. If this is so, the man who sent it here is mistaken, and it may be that it is a mistake all around.

Mr. ADAMS. You can not take cognizance of that. You stated before it was labeled "*colored with vegetable matter.*"

Mr. HOUGH. The label is that it contains *creme de menthe* artificially colored. That is the material fact in the case.

Mr. ADAMS. I understood you to say that it was labeled "*colored with vegetable coloring.*"

Mr. HOUGH. I do say there was a little label on the neck of the bottle, as I understand, that is, a separate label, "*colored with vegetable coloring.*"

Mr. FIELD. That is not a true statement of the fact?

Mr. HOUGH. Well, assume that it is not, for the present. It is asserted that it is a true statement of the fact, and I am informed by chemists that it is not always possible to distinguish between the two. But if the coloring, no matter what it was, does not make the substance deleterious to the health of the people of the United States, I think any other question is technical, because the main proposition is, I think, that a man can not send over here anything marked falsely as to contents, and this was not so marked. For instance, to send over an article marked "*olive oil,*" that is not, but is cotton seed oil, would be to send an article that would be incorrectly labeled.

Mr. ADAMS. That would not be injurious to health.

Mr. HOUGH. But that would be merely falsely branded as to contents.

The CHAIRMAN. It all comes back to the fact that chemists disagree just as doctors disagree. When you get chemists to agree you will get doctors also to agree.

Mr. HOUGH. On a disagreement that is not material to the health of the people should such an action be predicated?

Mr. CANDLER. Have you not any relief in the courts in a case of this sort?

Mr. HOUGH. The trouble is that a decision would not be reached until three years. I think it takes three years to get it to the Supreme Court of the United States. It takes two years to get to the court of appeals in most of the States. This would have to go to the court of appeals and the United States court, because if you started it in a State court it would be removed, and the appellate divisions of the United States court of appeals are not all up with their dockets. I have a case similar to this in the United States circuit court that has been in the courts for two years, involving a similar principle—the value of the property—and the man was fighting for a principle—and the value of the property is \$100, and he has spent \$2,000 in costs.

Mr. ADAMS. You know perfectly well, as a lawyer, that such a case as you cite would not stand in any court in the United States—not for a minute.

Mr. HOUGH. You mean they would not sustain the action of the Bureau?

Mr. ADAMS. They would sustain it, beyond any question, as a matter of law; because it is, as you will concede, I apprehend, falsely labeled.

Mr. HOUGH. Not as to contents.

Mr. ADAMS. It is as to contents, because it is labeled colored with vegetable coloring matter when it is not.

Mr. HOUGH. Well—

Mr. LEVER. What is the purpose in your manufacturer over there mislabeling this creme de menthe?

Mr. HOUGH. It was not intentionally mislabeled. That appears from the telegrams that were sent. Creme de menthe is what, naturally? Any liqueur is what? Whisky is what, naturally? All spirits are what, naturally? If any of them has any color, it has been artificially colored. Now, the coloring of creme de menthe has been almost exclusively a coal-tar coloring. They used in some places, in the beginning, a vegetable coloring and found that it would not hold the color and gave sometimes a bad taste to the liqueur. They used a coal-tar coloring because a very much smaller amount would give the color, and it would hold the color better.

Mr. LEVER. But in this special case they labeled it vegetable coloring, did they not?

Mr. HOUGH. Yes, sir.

Mr. LEVER. For what purpose?

Mr. HOUGH. Because they believed it was vegetable coloring.

Mr. LEVER. Oh, yes.

Mr. HOUGH. They thought it was vegetable coloring. They bought it for vegetable coloring. It was the same coloring matter that was used on other shipments which passed and had been approved by the Department as vegetable coloring.

Mr. LEVER. And the manufacturers did not know what they were using in their own product?

Mr. HOUGH. How can any manufacturer tell, if he does not make it himself? He buys it as a vegetable coloring.

Mr. COCKS. Do you contend that an ingredient is not contents?

Mr. HOUGH. Yes, sir.

Mr. COCKS. All right.

Mr. HOUGH. I say that the language of this would not be construed in any court as covering ingredients and that that would not be regarded as falsely labeled by the ruling of any court. If it is called *creme de menthe* and is *creme de menthe*, it is correctly labeled as to contents.

Mr. LEVER. Is this vegetable coloring preferable to coal-tar coloring?

Mr. HOUGH. No, sir; because it is distasteful.

Mr. LEVER. There is no preference?

Mr. HOUGH. I think the preference is for the coal-tar coloring. The position taken by the Bureau of Chemistry is that the coal-tar colorings have to be excluded. I do not know why they took that position in the beginning. The doctors say that saccharin, which is a coal-tar product, is the healthiest thing you can put in your stomach. They prescribe saccharin for use in tea and coffee when you can not take sugar. The proposition is that it is very healthy. I read a brochure on the subject, which stated that there was nothing in the coal-tar proposition that affected the health at all.

The CHAIRMAN. Is not that the principal dye used in coloring butter?

Mr. HOUGH. Yes, sir; they say it is. Any butter but June butter is white butter, and that is the coloring that the dairymen of the United States use when they want to get the coloring of June butter. However, the fact that somebody else in this country uses the same coloring does not make any difference if it is wrong to use the color. The point I make is that the power is exercised in a technical manner. It does not go to the spirit of the law, which meant that something should be kept out which was deleterious to health or which was not the thing it was represented to be. In other words, if the package does not contain *creme de menthe*, it should be kept out because it was not correctly labeled; or if it was dangerous to the health of the people of the United States, it should be excluded; but those principles are applied in a technical manner and not according to the spirit of the law.

For instance, the laws as to distilled spirits in the United States were intended solely for the purpose of getting the revenue, and all those laws are for the purpose of protecting the revenue, and the courts have frequently stated that they were not intended to be applied in cases which did not involve a fraud on the revenue, although there was a technical violation of the law. The law, for instance, says that the spirit at the time it leaves the still shall run through continuous pipes—worms—until it goes into the receiving cistern, and if the pipe is detached at any time during the operation it is a violation of the law.

A man opened the pipe at onetime at his still in Omaha for the purpose of cleaning something or saving the spirits, and the revenue officers seized the distillery and he was fined \$1,000. The Supreme Court of the United States said that the law must be enforced according to the spirit and not according to the letter of the law, and that it was a violation of our sense of justice and fair play to enforce the law in that way. It is true what was done was contrary to the letter of the law, but it was not contrary to the spirit of the law, because he did not make his opening for the purpose of taking the spirits out and defrauding the Government of the tax.

I think that the provision we are discussing is a very good provision, and it ought to be in some law. It is in the pure-food bills which are now pending, but I suggest that in advance of the consideration of

those questions, when we can hear all the pros and cons by all the people interested, the power ought not to be given in an appropriation bill. If the power must be given in an appropriation bill, some safeguards should be thrown around it.

Mr. FIELD. I would like to ask you one question. Is it possible that capable chemists could have disagreed as to whether this ingredient was a vegetable or a mineral substance? Is not that a fact so well established in chemistry that no capable chemist would disagree on that proposition?

Mr. HOUGH. I have just submitted that question to three of the principal chemists of the country, to advise me about that.

The CHAIRMAN. Will you not repeat that question, Mr. Field? I did not hear it.

Mr. FIELD. I asked Mr. Hough whether capable chemists could have disagreed on a simple proposition as to whether this ingredient was a vegetable or a mineral substance.

Mr. HOUGH. The amount that would be in a bottle would be only an infinitesimal amount, and I take the position that it is not and should not be regarded as dangerous to the health of the people of the United States, whether it is the one or the other.

Mr. HENRY. Should not a man brand his goods just as they are?

Mr. HOUGH. Yes, sir.

Mr. HENRY. If it is a mineral, an aniline color, he should so brand it?

Mr. HOUGH. Yes, sir; but should he be punished for a mistake in that, when the chemists disagree?

Mr. FIELD. I wanted to know whether chemists could disagree upon so simple a proposition as that?

Mr. HOUGH. Some of the propositions which seem simple, when you come to work them out are not quite so simple. I have thought many things were simple until I began to learn so much about the views of chemists on pure-food questions.

Mr. FIELD. Would you admit this to be true: If that is a proposition that can be clearly demonstrated by analysis and about which capable chemists can not disagree, would you not say that it was the duty of the importer of the goods to have informed himself about a matter so easily to be known, and not incorrectly label his goods?

Mr. HOUGH. I think no one should mislabel his goods about any fact, whether it is material or immaterial to the main proposition.

Mr. FIELD. Should he not have ascertained a fact so important as that?

Mr. HOUGH. I was going to say this: Here he uses as a coloring matter the same thing used by him on other shipments shipped here and passed by the same inspector, which were conceded to be vegetable coloring. Has he not a right to assume that the same thing would still be regarded as vegetable coloring?

Mr. FIELD. But do you think that because of lack of attention it escaped the scrutiny of the inspectors on this side—

Mr. HOUGH. I beg your pardon. They investigated it, and it did not escape their scrutiny.

Mr. FIELD. And this man was advised of the conclusions reached by the inspectors?

Mr. HOUGH. Undoubtedly, that it met the requirements of the law.

Mr. FIELD. Then it is a question of fact as to whether this coloring matter is the same as they had previously used?

Mr. HOUGH. Yes; and a question of good faith, too.

Mr. HASKINS. You are a lawyer, and I assume that you have had an extensive practice; and is it not true that chemists would be liable to disagree the same as doctors disagree when called to testify as experts in a case on trial?

Mr. HOUGH. Yes, sir.

Mr. HASKINS. And they would testify and give an opinion in favor of the party that calls them and pays for their services?

Mr. HOUGH. I do not say that all of them will. I think there are always some chemists who will take the view that it is to their interest to take; but I think there are many chemists that will not take the view that it is to their interest to take if it is not in conformity with their beliefs in the matter. I can name a dozen chemists of that caliber who are far above anything of that kind.

Mr. LEVER. There would be no reason for the Bureau of Chemistry taking anything but an impartial view in a matter of this kind?

Mr. HOUGH. No, sir; certainly not. I assume they are acting in good faith. But this is technical, and it does not go to the spirit of the law, and if the amount of coloring in this case is not so great in these goods as to make them dangerous to the health of the people of the United States, and this man did not knowingly mislabel the goods as to this fact, and it is not a material fact as to whether it is injurious or not, then they should not have stopped the shipment.

The CHAIRMAN. That chemists do disagree on very simple matters is instanced in the matter of this copper poisoning. Mr. Woods and Mr. Galloway declared here the other day that they had never known a case of copper poisoning. Doctor Wiley, on the other hand, says that copper is a deadly poison.

Mr. FIELD. It is most natural for them to disagree as to the effects, but can chemists disagree as to the very ingredient? Of course they disagree about its effects; that is a field of speculation; but I can not conceive how capable chemists should disagree as to whether it is vegetable or mineral.

Mr. BROOKS. In other words, they can not disagree on the fundamental fact.

Mr. FIELD. No, sir.

Mr. ADAMS. In enforcing the dairy and food laws of my State for four years and having many prosecutions in court and having one of the most competent chemists in the United States, A. S. Mitchell, as chemist, I never heard that question raised at all, so far as this particular thing is concerned. There was never any trouble at all in distinguishing between two coloring matters.

Mr. FIELD. I supposed that would be admitted; if not, there would be nothing exact in chemistry.

The CHAIRMAN. Doctor Wiley, do you wish to be heard?

STATEMENT OF DR. HARVEY W. WILEY, CHIEF OF THE BUREAU OF CHEMISTRY, DEPARTMENT OF AGRICULTURE.

Doctor WILEY. Mr. Chairman, I think I might begin at the end of Mr. Hough's statement and go back. Take the case that is most fresh in our minds. This case about the creme de menthe is a most simple one. According to Mr. Hough's testimony aniline dyes are not harmful. He says that they have used the same dyes for coloring heretofore that

were used in coloring this creme de menthe, yet they put on this bottle this new label. It was the first time that they had done that. The other shipments did not have on them "pure vegetable coloring." If they had left that off, we never would have inspected the sample at all, but seeing that this was a new departure we thought that we would examine this color to see if it was a vegetable color. We found in the inspection, which was made by Mr. Doolittle, the former State chemist of Michigan, that it was coal-tar dye. We never judge on the analysis of one man in spite of the presentations which have been made here.

We never form a judgment to exclude any food product, or to give any annoyance to any importer on the word of a single chemist. We had that confirmed by two independent chemists working separately. This sample was sent to us at Washington, and our chemists knew nothing of what had been done in New York, and they made perfectly independent examinations and they all reached the same conclusion. Whereupon Mr. Engs was informed that the goods were misbranded under the law.

Now, the effort has been made here to-day to show that this law refers solely to injury to health. That is not the case. That is one of the things prohibited by the law; but there are other things prohibited whether they are injurious to health or not. One is the misbranding of the goods, the other is a false statement as to the place of manufacture. That would certainly have no influence as to health. Therefore it would have no place in this law were it a health law alone. The first prohibition of the law is, if the article is forbidden in the country where it is made. That has nothing to do with health. If it is forbidden, it may be for other causes. So that I claim that this law is not a health law pure and simple. If I were a lawyer I would try to make an elaborate argument on that.

We informed Mr. Engs that his goods had been found misbranded and gave him an opportunity, as we always do, to present his evidence.

Mr. HASKINS. It is a law to prevent imposition.

Doctor WILEY. We wrote him, I think, a very nice letter, and I will read it to you, signed by the Secretary of Agriculture. I have been accused here of writing a good many letters which the Secretary signs. That is true. That is true in every Department. Who thinks that the Secretaries of the Departments write all the letters that they sign? Very few. The Secretary may write a few now and then; but the great mass of the letters are written by his employees. These are instances of this kind.

I did write this letter that Mr. Hough read to show that he had been misinformed as to the action of the Portland convention. We have absolute proof from the secretary of that association, who is certainly a better authority than an Oregon paper, that Mr. Hough had been misinformed. But all these letters are written by people in the Department. The Secretary signs hundreds of letters that I doubt if he ever reads, in just that way. This letter, written to Mr. Engs, reads as follows:

JANUARY 22, 1906.

P. W. ENGS & SONS,
268 West Broadway, New York, N. Y.

GENTLEMEN: I note your statement of the 19th instant, that the shipment of creme de menthe per steamship *Philadelphia*, entry No. 6833, custom-house invoice No. 8849, is colored with a pure vegetable coloring matter. The investigations in the lab-

oratory at New York, which have been confirmed in the laboratory here, show that the coloring matter is a coal-tar dye. Your statement to the contrary is not considered sufficient evidence. We will give you sufficient time to submit chemical evidence obtained from any chemist you see fit to employ to make the examination, and I have instructed our chemist in New York to furnish you with a sample for this purpose which you may have analyzed.

Mr. Doolittle will retain a portion of the sample for reexamination in case your chemist should find that the coloring is a purely vegetable matter. If your chemist finds that the coloring matter is a pure vegetable color, and our new examination of the sample confirms this, the invoice will be promptly released; otherwise, the proper instructions will be given respecting the disposition thereof. I beg to call your attention to the fact that it is not illegal to detain these goods as you say. We are acting in direct compliance with the provisions of the law in this matter.

Respectfully,

JAMES WILSON, *Secretary.*

The statement of Mr. Engs, referred to in the foregoing letter, made a demand which was hardly couched in the language it should have been when addressed to the Secretary of Agriculture. He said:

NEW YORK, January 19, 1906.

HON. JAMES WILSON,

Secretary, Department of Agriculture, Washington, D. C.

DEAR SIR: We are again forced to bring to your notice the question of the detention of 25 cases green creme de menthe, out of an importation of 40 cases of ours, here in New York City, ex steamship *Philadelphia*, entry January 8, 1906, entry No. 6833, consular invoice No. 8849, and which the chief of the food laboratory of this city detained under date of January 15, 1906, under his No. 3724, he claiming these goods were artificially colored with a coal-tar dye, although labeled "pure vegetable coloring," and directs that same be ordered reshipped, and asks us that if we have any evidence to present why these directions should not be executed to present same on Monday next, the 22d instant.

We must protest against the detention of these goods, and would thank you to notify the department here to release same promptly, for the reason that these goods are actually colored with a pure vegetable color and are properly labeled, and anything and everything contained in the goods is pure and is not harmful to any of the citizens of the United States, and goods are being unlawfully detained.

Since the promulgation of the pure-food laws we have brought into this city not less than from eight to ten shipments of the same green-colored creme de menthe, and each and every shipment was released, and the present shipment is identical with previous shipments.

Under these circumstances we would thank you to wire the chief of the food laboratory of this city to release these goods to us, we being in need of them, and we await your response, which we trust to receive to-morrow.

Very truly, yours,

P. W. ENGS & SONS,
Per LOUIS J. SNYDER, *Treasurer.*

We are perfectly willing to go to court on this case and have the matter tested as to whether it is a correct interpretation of the law. I am not a lawyer. We submit cases from time to time to the Attorney-General, and we are willing to be guided by him and by the courts in this matter. If the law does not mean that the word "contents" relates to what is in the bottle, we would like to have it so construed. Creme de menthe is a mixture of a number of ingredients—essential oil, sugar, alcohol, etc.; and it takes them all to make creme de menthe, and if it is misbranded it seems to me any misstatement as to its contents is a misbranding.

That is the interpretation made by the Department of this law, and we shall continue to execute the law with that idea until some judicial decision shows us that we are in error. I hardly think that the law needs changing. I will admit that chemists are not infallible, and I will admit that we may do injustice to an importer by a wrong analysis

or a wrong construction, but we certainly never have any intention of treating an importer in any but the most fair and proper manner. We permit him an opportunity to submit any kind of evidence he wishes, but we must detain the goods, because if we did not, and the evidence should show that the goods were not properly branded, and were injurious to health, the goods would be gone and we would have no recourse.

The CHAIRMAN. How much time do you give them?

Doctor WILEY. As much as they want. We have given as high as two or three months.

The CHAIRMAN. In the meantime you hold his goods?

Doctor WILEY. Yes; when we notify a man we say, "You may appear on or before such a date," and if he writes before that day that he wishes more time, we always oblige him. We have never refused anybody any reasonable time or any time that he wanted.

The CHAIRMAN. Would thirty days strike you as a reasonable time for both sides?

Doctor WILEY. It is in most cases; but in this particular case we are waiting for the certificate from France. We got a cable from our consul asking us not to ship the goods back, and we certainly will not do that. We are waiting for the whole testimony, and if we find that that is vegetable coloring we will release those goods instantly and pay all the charges of detention, but certainly not if we find they are not so colored, because there is a deliberate intention then to deceive us and to deceive the people of this country.

The CHAIRMAN. This amendment here refers to the payment of those charges?

Doctor WILEY. Yes, sir. We do pay charges on all goods detained, but we do not think that we should pay charges on them when they are found unfit for entry and are sent back. That amendment is to cover that point. Perhaps this is an extreme case. We certainly never would have inspected this material if we had not seen the label "Pure vegetable coloring" on the bottles. We know that creme de menthe is artificially colored, and that sometimes it is colored with a vegetable dye.

Mr. CANDLER. Do you inspect all of them?

Doctor WILEY. It is impossible for us to inspect all the invoices individually with our force. We inspect only those which we think demand inspection, as we see them on the floor of the appraiser's office. It was simply to see, in this case, if the statement was true; so that they got themselves into this trouble by putting that label on there. They ought not to have done it.

The CHAIRMAN. It was protesting too much?

Doctor WILEY. Yes, sir; it was protesting too much.

Mr. HAUGEN. If the importer should remove that label, or destroy it, would not that release the goods, or would they still have to be returned?

Doctor WILEY. We often do release goods where we are certain that the importer has not attempted to deceive us; but where we are certain that he has attempted to deceive us we do not. We give him always the benefit of the doubt in such cases.

Mr. HAUGEN. What do you think about that in this case?

Doctor WILEY. I think that is an attempt to deceive. That is my opinion of this case.

Mr. HAUGEN. Is this coloring matter injurious to health?

Doctor WILEY. It may or may not be. We have not determined that point.

The CHAIRMAN. This is what is called a question of false labeling?

Doctor WILEY. Yes, sir; it is a question of false labeling. We are not judging it on the other ground at all.

Mr. LEVER. But the vegetable coloring is not injurious, certainly?

Doctor WILEY. Of course, the ordinary chlorophyll is not; that is what we expect the ordinary green vegetable coloring matter to be.

Mr. LEVER. They put that label on to deceive?

Doctor WILEY. That is our opinion; but we are now simply giving them all the time they want to submit their evidence. And if they want to take those goods out, they can take them out and sell them by giving a bond to the Secretary of the Treasury for double their value, and if they are not all right they pay the bill. If they are certain these are vegetable-colored goods they can take them and sell them without let or hindrance. We are not seeking to break up anybody's business.

And, moreover, the great majority of importers in New York highly approve the execution of this law. I have a communication from one very large oil importer in New York which I wish I had brought with me, who said, "Since the people know that my oils have been inspected and that the adulterated oils are no longer allowed to enter this country, my sales have increased threefold, because the confidence of the people is restored to the oils coming into the country." As I told you the other day, we have absolutely stopped the entrance of the adulterated olive oil. We take samples once in a while for our own satisfaction, but it is the rarest thing in the world to find any adulteration.

The CHAIRMAN. That is adulterated with cotton-seed oil?

Doctor WILEY. Cotton-seed oil, sesame oil, and peanut oil. Not one of them is injurious to health, and yet if we find them we stop them, because they are falsely branded. Saccharin, that my friend spoke about, is forbidden in almost every country in Europe, and is not permitted to be sold at all except by order of a physician. If you attempted to sell a package of saccharin in some countries in Europe you would be arrested and imprisoned. If you should ask the reason why, you would be told that it is not only injurious to health, but it is a fraud upon the revenues, because it is a substitute for sugar.

I will say frankly that I have not investigated the effects of saccharin on health. I do not object to it on that account, but I do object to it as a fraud.

Mr. FIELD. Is there not saccharin from sugar cane and other sources?

Doctor WILEY. Yes, sugar; but this saccharin is benzoic sulphinide. It is very sweet, perhaps about 300 times as much so as sugar. It has no relation to sugar. It has absolutely no relation to it in any way. It is sweet just like sugar of lead is sweet, only more so.

Mr. CANDLER. Speaking of coal tar, what are the ingredients of these coal-tar dyes?

Doctor WILEY. Nearly all the coloring matters of coal tar are aniline dyes. There is a large number of methyl dyes—methyl blue and methyl green and yellow—which are made from wood alcohol. I regard them as all poisonous, because the base is poisonous. Wood alcohol is poisonous. But nearly all the dyes we use in food of the coal-tar dyes are aniline colors. Some of them are forbidden in Euro-

pean countries, not because the aniline itself is always poisonous, but because it is sometimes tainted with arsenic. It is almost impossible to keep it out, because it is in the coal itself and accumulates in the by-products, and therefore is in the dye.

The next point in this matter of the law to consider is the bottled-in-bond whisky. I have been accused before this committee of promoting the sale of bottled-in-bond whisky for the purpose of injuring the sale of blended whisky. You were told that that article of mine which I wrote at the request of the editor of the London paper was written with this deliberate intent. I said in the beginning of that article that anything I said must not be construed as official, and the editor requested me to write this for his paper, and I did. He wrote to me to know what method we had here for assuring the purity of the whisky, and I told him if he would buy the liquor with the excise stamp on it he would be sure of its origin.

Now, I was not even thinking of bottles when I said that, because I did not think any one would want to trouble with exporting such a small quantity, but I was thinking of barrels. The barrel has an excise stamp on it just as the bottle has, and he can tell just as much, and can be just as sure, as by inspecting the stamp on a bottle. Therefore the accusation in that matter that I am promoting the sale of bottled-in-bond whisky has no foundation in fact, and that was not my intention, and even if it had been I would not be ashamed of it.

Mr. TRIMBLE. Do you not think the only way a party can be assured that they are getting good pure whisky, or what they think they are getting, is buying it bottled in bond?

Doctor WILEY. If you must buy any, unless you are rich enough to have your barrel, which most of us are not.

Now, during the recess I went down town and bought a bottle of whisky. I am going to present this to the committee. I do not know anything about its wholesomeness, but I know that it is pure. That bottle has the United States certificate showing the date when it was distilled, and the date when it was bottled, and by subtracting one from the other you can tell how long it remained in the wood under the seal of the United States. [Producing bottle of whisky.] Now, is there anything in telling a man how he can get a straight whisky by buying a whisky bottled in bond which disqualifies me from enforcing this law or makes me unfit to hold my office? The complete article is as follows:

MARCH 6, 1906.

EDITOR THE WINE TRADE REVIEW,
Eastcheap Buildings, London, E. C.

DEAR SIR: It gives me pleasure to comply with your request of the 21st ultimo to contribute a short article to your "Review" in regards to my opinions respecting the labeling of distilled spirits and beverages. I beg you, however, to consider that this communication is not in any sense official. You understand, of course, without further illustration, that I could not express any official opinions except through the regular channel. In fact, you ask for an expression of my views and this I gladly give.

By the word "purity," as applied to distilled spirits and beverages, I mean that they are true to name and are exactly what they are represented to be or what the consumer believes them to be. As an illustration, I may say that the word "brandy," as I understand it, should be applied solely to the product obtained by the distillation of sound wine. This product is placed in wood and kept in storage a sufficient time to allow the ripening process to fully develop. Alcohol which comes from any other source than from the distillation of wine is not admitted into a substance known and sold as brandy.

In like manner "purity" as applied to whisky, as I understand it, means a product obtained by the fermentation of cereals, the starch of which has been converted into sugar by the action of malt. This distillate is collected and stored, as in the case of brandy. The distillate in each case should contain the whole of the volatile matters, whatever be their nature, which are converted during fermentation, except possibly some of those which come over at the very first or at the very last of the distillation. In other words, the still must not be a chambered still, though it may separate some of the more objectionable products in the usual method of preparation.

While I should have no objection to the manufacture of compounded beverages nor to their sale and consumption, provided no deleterious substance is used in their production, I think they should be sold under distinct names, so as to clearly indicate to the consumer that they are compounds. I certainly should have no objection to the manufacture and sale of a blended whisky, meaning by a blended whisky one which is made from mixtures of two or more whiskies. If these mixtures are of different ages, the age of the oldest one should not be used in connection with the label.

Scotch whisky, from the best evidence which I can collect, was originally made by the fermentation of barley malt without the addition of other cereals, and the whisky was made and its reputation established in accordance with this method of manufacture. In this case Scotch whisky is a name which should be applied only to the product obtained by the distillation of the fermented mash of barley malt. Moreover, this distillation should be carried on in a pot still, as described above, and the product stored in wood and suitably aged. If I have been correctly informed, the so-called "smoky flavor" of Scotch whisky is due to the fact that malt, after sprouting, is dried over burning peat, which imparts the empyreumatic flavor thereof. If this be the case, the addition of a substance known as "essence of Scotch whisky" to any other kind or kinds of alcohol or to any other whisky or mixture could not possibly convert such a product into Scotch whisky. Further than this, the admixture of greater or less quantities of high wines or pure alcohol with genuine Scotch whisky could not make a mixture which should be called by the name of Scotch whisky.

These views of mine in regard to the correct labeling of whisky are based on the information which I have at hand. If it be true that Scotch whisky has never been made in the manner which I first described, then my deductions would to that extent be erroneous.

Wine I define as the product produced by the fermentation of the juice of sound, ripe grapes. I would not admit the name "wine" without qualification to a product obtained by the fermentation of a mixture of grape juice and added sugar, but some other term rather than wine or some qualifying term should be employed to designate such a product. Wines, too, should not bear false labels as to the date of manufacture or the locality of the vineyard where made.

Beer has been defined in various ways. In Bavaria, I believe, it is the product produced by the fermentation of malt with an infusion of hops. In this country beer is made sometimes from malt alone with an infusion of hops, and sometimes partly with malt and partly with unmalted cereals. I am inclined to think that the word "beer" might cover these different products. I do not think, however, the term "beer" should be applied without qualification to a product in which sugar has been used as a partial source of the alcohol which the beer contains.

The above in brief are my views regarding the correct labeling of fermented and distilled beverages. Inasmuch as our law forbids the importation into the United States of misbranded or mislabeled food products, it is of the greatest importance to us to secure all the information possible concerning the basic principles of classification. If I have made any assumptions in the above outline which you think are not in harmony with the facts I should be glad to have you point them out editorially.

Since writing the above I have read with much interest the February number of the Analyst, containing the interesting paper of Mr. Hehner and the illuminating discussion thereon. I hope the day may never come in Great Britain when "any old mixture" of spirits and artificial flavors shall be deemed worthy to bear the name "whisky" or "brandy." We have in this country one infallible method of tracing the purity of a distilled beverage by means of the excise stamp. That method should be adopted everywhere.

Any Englishman who wants to import pure American whisky can do so by seeing that each package is properly stamped by our internal-revenue office. Why should not we be able to assure ourselves of the purity of a British whisky by the stamp? Yet I have never seen a Government stamp on any package of British liquor imported into this country! If the chemist be impotent, as the discussion in the Analyst seems to imply, let us all ask the excise departments of the various governments to come

to our rescue. Then our consuls who visé the invoices could tell us when each consignment of Scotch whisky was distilled and what it was made of.

I may add that our statutes relating to the internal revenue do not recognize the right of mixed or compounded liquors to bear the names of the genuine articles. Section 3244 of the Revised Statutes contains the following provision:

"Every wholesale or retail liquor dealer who has in his possession any still or leach tub, or who keeps any other apparatus for the purpose of refining in any manner distilled spirits, and every person who, without rectifying, purifying, or refining distilled spirits, shall, by mixing such spirits, wine, or other liquor with any materials, manufacture any spurious, imitation, or compound liquors for sale, under the name of whisky, brandy, gin, rum, wine, spirits, cordials, or wine bitters, or any other name, shall be regarded as a rectifier, and as being engaged in the business of rectifying."

Under our law, therefore, it is evident that a distilled spirit mixed as above and sold as whisky, brandy, etc., is a spurious or imitation article.

Respectfully,

H. W. WILEY.

The Secretary has often been asked in the last few years to remove me from office for being incompetent and corrupt and unfit for the place. I want to say that any member of this committee or any American citizen can buy a bottle of whisky in bond and know what he is getting, and you can not do that with any other bottled whisky that is put up in this country. Some of them are perfectly straight, without any stamp over them, and lots of the straight whiskies are sold bottled without a stamp; but I say that you can not know that. But you do know about this [indicating bottle].

Mr. CANDLER. Is there any inspection of the whiskies that go into bond?

Doctor WILEY. Not as to wholesomeness, but as to what they are there is a very rigid inspection. And nothing is allowed to be put in that whisky except what nature put in it, and there is nothing taken out of it except what is taken out in the ordinary process of distillation. The excise officers will not allow you to add even pure alcohol to that whisky.

Now, that is the poisonous whisky which Mr. Hough has told you about, and he is so anxious for the people to know that it is poisonous that he or some of those interested in the matter are putting into the papers of the United States an advertisement, sometimes daily, sometimes once in a while, calling attention to the fact of the tremendous poisonous properties of these bodies. They may be poisonous—I will not say they are not. But I do say they are straight whiskies, and are what they pretend to be in every particular. I had here one of the advertisements, but I do not happen to put my hand on it just now. It may turn up after a while.

Another advertisement which is being circulated at the present time all over the United States is one which I happen to have in my pocket. I cut this out this morning. I think it was in the Post of this morning. The Post and the Star in this city are carrying these advertisements, strange as it may seem. Here is a double-column advertisement on blended whiskies [indicating advertisement]. It is not signed by any firm, but it is an advertisement. It says:

[The Washington Post, Tuesday, January 30, 1906.]

PURE WHISKY.

The term "pure whisky" is properly understood by the public to mean a whisky which is free from impurities.

"The word 'pure' means wholesome or ordinarily pure, as used in act 1874, requiring water companies to furnish pure water."—Commonwealth v. Towanda Waterworks, 15 Atl. 440.

Impure whisky is a whisky containing a large amount of impurities.

"There are volatile principles naturally existing in the grains which accompany the liquor in all its changes and give their characteristic flavor to the resulting spirit. These can scarcely be considered as impurities, but there are others produced during the process of fermentation which seriously serve to contaminate the product. Among these is fusel oil * * * from which it is very desirable that the spirit should be freed as soon as possible."—United States Dispensary.

"The term 'fusel oil' means a collection of these higher alcohols which are produced in the fermentation of the mash. These alcohols, however, pass over with the water in the still. Some of them have higher boiling points, but they are carried over mechanically, so that they all appear in greater or less quantities in the product. Now, in order that this product be good for consumption, it is necessary that this fusel oil be removed."—Statement of Dr. H. W. Wiley before the Pure-Food Congress.

"When whisky is bottled in bond there is no guaranty in the Government's stamp that it is wholesome. It may be, as Mr. Hough says, a very unwholesome article.

"The Government does not guarantee the purity."—Statement of Dr. H. W. Wiley before Senate Committee on Manufactures.

BOTTLED-IN-BOND WHISKIES MOST IMPURE, AS SHOWN BY RECENT PROSECUTIONS UNDER PURE-FOOD LAWS OF MINNESOTA.

"'Bottled in bond' is the alluring and reassuring labels on bottles of whisky which is being sold to retail dealers in the twin cities, and by them dispensed to patrons. Analysis by the chemists employed by the dairy and food department of the State shows that in many instances the whisky contains enough fusel oil to kill a guinea pig."—St. Paul Dispatch, Thursday, January 5, 1905.

"In two or three samples of bottled-in-bond whisky I did find in the neighborhood of 0.50 per cent of fusel oil. These results were a great surprise to me, and on repeating the analysis I was unable to lessen the results materially."—Statement of Julius Hortvet, chemist of dairy and food department of Minnesota.

"It is quite natural that any distiller, finding himself with a lot of poor goods on hand, should seek some way to get rid of what he can not sell to his regular wholesale customers; so he bottles it in bond and depends on the little green stamp to help him work it off on an unsuspecting public."—De Bar's Circular.

RECTIFICATION ALONE PRODUCES PURE WHISKY.

"The manufacturer of whisky or any other alcoholic liquors rarely purifies the products, but disposes of them to the rectifying distiller, whose business it is to remove from them any contaminations which render them disagreeable or highly injurious."—Muspratt, page 90.

"Pouring the wines into the vat was the first act toward rectification, which was followed by the rectifying process, thereby changing the wines into whisky."—United States v. 8 Bbls., 6 Int. Rev. Rec., 124. United States Court decision.

[Washington Star, February 5, 1906.]

BLENDED WHISKIES.

Blending is the art of giving flavor.

"Apart from the flavor, all whisky, whether straight or blends, which are equally free from impurities, are identical in substance."—(Muspratt, p. 99.)

All whiskies, whether straight or blends, consist only of ethyl alcohol and water, plus a flavor.

Ethyl alcohol and water, without a flavor, is termed, for commercial purposes, neutral spirits or silent spirits.

"All spirits consist of a more or less diluted ethyl alcohol containing traces of the higher boiling compounds, commonly called fusel oil, the proportion depending upon the care exercised by the distiller in stopping the distillation when the vapor temperature rises above the boiling point of ethyl alcohol and certain flavoring bodies, depending upon the material employed." (From Report of Commissioner of Int. Rev., 1889.)

"Whisky is certainly a spirit consisting of alcohol and water, with a small quantity of by-products coming from malt or grain which give to it a peculiar taste and aroma. It may be diluted with a certain quantity of water without ceasing to be whisky, and it may be diluted with spirits containing little by-products to suit the pocket and palate of customers, and it still goes by the popular name whisky. Your committee are unable to restrict the use of the name as long as the spirits added are pure and contain no noxious ingredients." (From report of British Parliamentary Commission on Whisky.)

"We can not escape the logical conclusion which was arrived at some years ago by the Departmental committee on 'whisky,' that pure alcohol—that is to say, silent spirit—is, if anything, a more healthful beverage than the ordinary drinking spirits. All barring the necessary flavor. Everything turns upon the latter. The importance which the consumer attaches to the origin of a spirit is infinitely less than that which he attaches to the flavor." (Hegner, in the Analyst of February, 1905.)

"The ills of intemperance can be entirely avoided by abstinence from liquors vile with fusel oil, and by the use—either moderate or excessive—of those that are free from it. If men will drink alcoholic beverages, let them be those which are pure and, by reason of their purity, will not be a factor in the ruin of body and soul. Let the cupidity of the manufacturer and dealer be checked by a law which shall make it a crime to produce, sell, or use the poisonous liquors; and let encouragement be given to those who shall undertake to provide pure ethylic alcoholic beverages, harmless to the brain, medicinal in value, deficient in toxicity. Such prohibition, married with such encouragement, will appoint the only scientific specific for the evil of intemperance." (Dr. Willard H. Morse, in North American Review, July, 1888.)

One object of blending is to reduce the impurities in, and assist the maturing of, straight distillates.

"In a rough way a portion of the fusel impurities can be removed even from pot-still distillates, such as second feints, by adopting the diluting and decanting process carried out with the same feints at patent still works, if time be allowed for separation and the vessel be deep rather than broad." (Nettleton on Distillation.)

"Pouring the wines into the vat was the first act toward rectification, which was followed by the rectifying process, thereby changing the wines into whisky." (U. S. v. 8 Barrels, 25 Fed. Cases, 982.)

"The Latin epithet 'aqua vitæ,' the Irish term 'usquebaugh,' and the modern word 'whisky' are in point of fact synonymous.

"At the time (Henry VIII) the Irish were great proficient in compounding liquors, but their usquebaugh was their famous drink and in great demand.

"With respect to the nature or peculiarity of the spirits used in those times it is not now easy to determine, but usquebaugh seems to have been a general name for all compounded spirits, and plain whisky, as we have it at present, was not the common beverage, it being customary to infuse the liquor with some savory or tasty ingredient.

"Usquebaugh should be written iskebaghah or isqueboah, the former implying water of life and the latter living water. As isque or iske means water, it must appear evident that the word whisky is only a slight alteration in the pronunciation of the Irish term.

"The word whisky therefore is of very comprehensive import and fully expressive of this sense subduing beverage." (Morewood's History of Inebriating Drinks, 1821.)

I would like to ask Mr. Hough, if straight whisky is so poisonous, why he puts any of it in his blend? Why should he put in a compound when he can make it without any whisky at all. I would like to know why you have poisoned your blends?

MR. HOUGH. I will answer that. For instance, Doctor Wiley has not explained just how whisky is made.

DOCTOR WILEY. I did not ask him to do that. I asked him a plain question, and I will yield to him to answer that if he wants to do that.

MR. HOUGH. I can not answer the question without explaining the whole thing, and I can make it perfectly clear, as I am going

to make it to the Committee on Interstate and Foreign Commerce next week, so that they will understand exactly what the difference is between the bottled-in-bond whisky and the so-called "blended whisky." They will have the whole history of it, and it will take a longer time than this committee wants to give me this afternoon to do that.

But there is a decided advantage in mixing the whisky containing too much fusel oil, which is an impurity, and which does not contribute to the flavor at all, but which does operate on a part of the system that is not attacked by the ethyl alcohol, with an ethyl oil which does injure the flavor. There is a very decided advantage. They are two different substances. It is like mixing two lots of ice cream, one of which is flavored too strongly and the other is too weak, so that you get just the proper flavor. That is one reason for blending, and there are lots of others.

Doctor WILEY. You will admit that if you make it a half or a quarter poison, still it is poisonous?

Mr. HOUGH. Half or a quarter is a good deal better than whole.

Doctor WILEY. Why put in any?

Mr. HOUGH. That is not necessary, and prior to 1860 they did not do it. It is an outgrowth of the internal-revenue laws and the desire of the distiller to get a trade name in addition to the value of the product itself.

Doctor WILEY. I have now found this other advertisement I spoke of. I will submit both of these for the record (see p. —). It is very strange how these crop out at certain periods. When the food-standards committee was meeting in Boston this appeared in the Boston papers, and it seems to follow the food-standards committees around the country. When this matter is agitated here it appears in the Washington papers.

Mr. HOUGH. Is that the one that ran last summer?

Doctor WILEY. No, sir; this was cut out of the papers now. It quotes me just the same in both papers. If I am such a poor authority I do not think Mr. Hough ought to quote me in his advertisements as he does here. This advertisement says:

The impure whisky is a whisky containing a large amount of impurities. Bottled-in-bond whiskies most impure. As shown by recent prosecutions under pure-food laws of Minnesota. Rectification alone produces pure whisky.

Now, if there is any value in this argument it must be carried to its logical conclusion, and all of these blended whiskies must be also impure and poisonous.

Mr. HOUGH. That is why I asked you to amend the pure-food bill by striking out the word "added," and you would not do it.

Doctor WILEY. It is strange that such a poisonous thing as bottled-in-bond whisky has such a continuous vogue. The last number of the Mida's Criterion, in the editorial department, contains the following statement: That the amount of whisky bottled in bond in the first five months of the fiscal year 1905 was 519,976 gallons. For the same period of 1906 it was 846,852 gallons.

And the editor says:

Whiskies bottled in bond continue to show a steadily increasing demand, which is best evinced by the statistical exhibit, compiled specially for the Criterion, for the first five months of the current fiscal year, and given herewith.

I will file these papers as a part of the record, and will not take the time to read them.

[From Mida's Criterion, February 1, 1906.]

WHISKIES BOTTLED IN BOND.

Statement of whiskies bottled in bond for first five months of the fiscal years 1906 and 1905 (July 1 to November, inclusive) given in tax-paid gallons.

	Kentucky.	Pennsylvania.	Illinois.	Ohio.	Maryland.	Indiana.	Total.
1906.....	542,565	259,263	23,481	10,518	6,406	4,421	846,852
1905.....	314,978	172,385	18,085	10,063	677	3,689	519,976

DETAILED STATEMENT, BY MONTHS, FOR 1906.

July.....	66,599	30,795	2,560	802	628	614	.....
August.....	75,255	36,908	4,682	574	507	405	.....
September.....	105,204	50,778	2,942	1,894	785	624	.....
October.....	146,943	60,281	4,355	2,568	1,536	717	.....
November.....	148,564	78,501	9,102	5,178	3,006	2,061	.....
Total.....	542,565	259,263	23,681	10,516	6,406	4,421	846,852

DETAILED STATEMENT, BY MONTHS, FOR 1905.

July.....	36,948	20,953	2,683	2,892	677	1,056	.....
August.....	49,424	22,864	2,879	1,081	.....	868	.....
September.....	60,510	29,918	2,899	1,099	.....	504	.....
October.....	77,682	46,506	3,332	1,268	.....	364	.....
November.....	90,593	52,144	6,242	3,753	.....	1,397	.....
Total.....	315,097	172,385	18,085	10,063	677	3,689	519,976

Now, I want to come next to the "Wiley honey lie," which was mentioned here this morning.

Mr. FIELD. If it would not disturb you, I would like to ask you a question.

Doctor WILEY. Very well.

Mr. FIELD. The principal question with me, and with others, perhaps, is that in your letter to the Manchester paper—

Doctor WILEY. The London paper.

Mr. FIELD. The effect of that was to impress the public mind with the fact that the bonded whisky was a purer whisky.

Doctor WILEY. I did not say that, except as I used the word "pure" in that letter. I used the word "pure," and defined what I meant by it—true to name, and what it pretends to be.

Mr. FIELD. True to name?

Doctor WILEY. Yes, sir.

Mr. FIELD. What is its name?

Doctor WILEY. Whisky.

Mr. FIELD. Now, I would like to know whether it is a purer or better whisky?

Doctor WILEY. You mean more wholesome?

Mr. FIELD. Yes, sir.

Doctor WILEY. In my opinion it is far more wholesome than the blended whisky, so called. That is the general opinion of physicians who have tried it.

Mr. FIELD. You do not know about the merits of the whiskies?

Doctor WILEY. I did not want to go into this question of what whisky is, but it is simply this: It is not alcohol or water that makes a distinct beverage. Alcohol and water are the same in all these beverages—rum, whisky, and brandy.

Mr. FIELD. Is that whisky which is put in bond the very whisky that runs from the still?

Doctor WILEY. Yes, sir; and never touched. That is the absolutely pure product of the still, and is never touched except when they go to bottle it, and then they are allowed to add water to make it 100 proof.

Mr. FIELD. Then it would be correct to say that it was straight whisky?

Doctor WILEY. Just what it is; straight whisky. I was very much surprised to find an article that I wrote for the Popular Science Monthly brought up here this morning. I did write that article. It was on the subject of adulterated honey. I said in that article that artificial comb is made and filled with glucose—I can not quote the exact words—and sold as honey without any intermediation of the bee. That is the lie to which reference was made in such polite terms here this morning. When attention was called to that, and the bee journals resented this statement, I said, which is true, that that was put in not because I supposed there would be any commercial possibility of doing it, but as a statement which would enliven what would otherwise be a very dull statement, and because I had it from a very high authority.

Strange as it may seem, last autumn when I was in Boston attending the meetings of the food standards committee I received a letter from a gentleman named Miller in Providence, who stated that he had in his possession the tools which were used for making the artificial comb, to which I referred in my article, and also a specimen of the comb. Mr. Miller has kindly submitted these to me, and I will show them to the committee, and also a statement to accompany them showing that this was done long before my article was written. He writes me as follows:

PROVIDENCE, January 30, 1906.

Dr. H. W. WILEY,

Care of United States Department of Agriculture, Washington, D. C.

DEAR SIR: I am in receipt of your favor of the 29th instant, and hasten to reply.

Sample of comb and the tools will go forward to you by express to-night. Information regarding them, the manner of operation, etc., will accompany them. The man who claims to have bought and sold similar combs filled with sirup is Mr. James A. Cull, of 180 Washington street, this city. He is now head of the firm of Cull & Williams, but at the time mentioned was in the grocery trade in Brooklyn, N. Y. I have always found him straightforward and upright, and the firm stands high in this community.

I believe one of the greater dangers which menace the consumers than artificial combs artificially filled is "honey" produced by feeding sugar to bees. The first is commercially impractical, as it would cost too much to be commercially profitable. The latter, you will see from the accompanying magazines, is already a commercial success. Though in a sense the stored sirup after its treatment by the bees is "honey," in the human stomach it acts very much like plain sugar sirup. Unless the bees while storing the sirup are also putting up a fair amount of highly flavored honey, or unless the sirup is so flavored, it is not, as a rule, difficult to detect the stored sirup by the taste.

Personally my interests lie largely with the bee keepers, and I have only assailed the feeding practice publicly because its practice, presumably for

legitimate purposes, is so persistently and widely taught. Ordinarily the least said on the possibilities of ways and means of adulterating honey the better, but in this case the fed honey is competing with the legitimate, and, furthermore, it is not so wholesome, to some persons, at least; hence, it is hurting honest bee keepers as well as the public. My position of making the matter public is the subject of some adverse comment by honest bee keepers, and is likely to be used against me by some persons to weaken my influence, but that can not be helped. However, in your work I shall be pleased to be kept as much in the background as possible, at least for the present.

Regarding the reprints referred to, I have had a copy forwarded to me, and I have sent into my paper a somewhat caustic editorial scoring the persons who are guilty of such scurrility. If it appears I will forward a marked copy to you.

If you wish more details regarding sirup feeding, I would refer you to the articles quoted in the marked passages and to any of the modern text-books on bee culture.

If I can be of further assistance please command me.

Very truly, yours,

ARTHUR C. MILLER.

Now, to show that the statement was no lie and could not have been a lie, because it was not told with any malice, I present to you here—and I will ask you to be careful of this, because I must return it—a sample of this artificial comb [handing same to the committee], and here are the tools or dies used in its manufacture [indicating tools]. There is no doubt about the absolute accuracy of that statement. But I did not come here to justify that. I will submit an article by Mr. Miller on artificial honeycomb for the record, published in the American Bee Keeper for January, 1906, giving a photograph of the inventor and a full history of the invention.

The article referred to is here printed in the record as follows:

[From the American Bee Keeper for January, 1906.]

ARTIFICIAL HONEYCOMB—THAT WHICH IS TO-DAY CONSIDERED AN IMPOSSIBILITY WAS ACCOMPLISHED OVER THIRTY YEARS AGO.

[By Arthur C. Miller.]

It has long been strenuously asserted that no such thing as artificial comb has been or can be made, and these assertions are continued notwithstanding the common knowledge of the Weed patents.

To be sure, his process is too expensive for commercial purposes, but that does not alter the fact that artificial comb has been and can be made. But artificial comb was made and used over thirty years ago, and through the courtesy and liberality of Mr. E. L. Fickett I am now the possessor of samples of such comb made about 1874, and of the tools for making it.

The process was invented by Mr. Philander Shaw about 1870 or 1872 and was worked over and developed by him up to about 1876 or later. In 1874 he filed application for patents on tools, and combs were exhibited at the Centennial Exposition in Philadelphia. Most of the combs made were 6 by 6 inches and intended for use in surplus honey boxes, but Mr. Fickett, who attended to the apriary end of the experiments, assures me that the bees used the combs freely for brood as well as for honey.

Mr. Shaw was a superintendent in a shoe factory, agent for machines used in the business, and an inventor of many appliances, one of note being a device used in the manufacture of shoes, another a hot-air engine, and another for the pressing of wood into forms imitating carving. Mr. Shaw died in Boston in 1879, aged 69 years.

His invention of artificial comb was ahead of the times and failed to be of profit to him. To-day it would be appreciated, and there is a possibility of its being put on the market the coming season.

Mr. Fickett, to whom the fraternity is indebted for keeping this invention alive, was born in Auburn, Me., in 1835, moved to Massachusetts in 1853, and began his bee keeping in 1860, and has continued at it ever since.

Mr. Fickett early made a specialty of raising queens, and supplied them to Mr. Kind, then running the Bee-Keepers' Magazine.

Mr. Fickett was the originator of the fruit-jar feeder, and describes its use in one of the New York bee papers about 1870. Despite his years, he is active and wide-awake to all the details of modern apiculture. He is a pleasant and affable man, and full of information on bee culture, past and present.

The accompanying illustrations are from photographs, that of Mr. Shaw having been taken some years before his death, while Mr. Fickett recently had his portrait taken expressly for the American Bee-Keeper. The other illustrations were taken from samples furnished by Mr. Fickett and now in the possession of the writer.

PROVIDENCE, R. I., December 11, 1905.

I did not bring these samples here to justify anything I said twenty-five years ago, at this time, but to call your attention to a reprint of this whole scandal.

Mr. TRIMBLE. When was this statement related to have been made?

Doctor WILEY. Twenty-six years ago. This is just now being distributed broadcast throughout the United States. Somebody has paid for it. It is a very large book, printed only on one side, with large margins, and entitled "The Wiley Honey Lie," and containing the libelous matter read by Mr. Hough before you this morning, that I had succeeded Ananias as the father of lies. Of course, if I am going to be a liar I would rather be at the head than at the foot of the column.

But why is this circulated broadcast throughout the United States to-day? What is the object of reviving a story of this kind, which can only be intended to be libelous and malicious, and circulating it without any signature, to every newspaper man in the United States, and thousands of other people. I have no doubt that it may have come to members of Congress.

Mr. HENRY. I have a copy.

Mr. HASKINS. I have a copy also.

Doctor WILEY. What is the object of it? I do not need to answer that question; it is so evident. That is the function of a newspaper correspondent who is going to use it probably for one of the magazines.

Now, this is all a part of an attack that has been made on the Bureau of Chemistry here to-day. I do not say that Mr. Hough is the author of this document. mind you, but it is a part of this campaign, and this campaign is propagated by some one in this city. Here is one of these "boiler plates," as they call them, which has been sent all over the United States to every newspaper. This, which is given below, was sent to the correspondent of the Boston Transcript, who sent it to me.

While it is generally admitted that strained honey is sometimes more or less adulterated, those interested in the production of honey insist that the presence of honey in the comb is absolute proof of its purity. This fact would be accepted by all, say the honey men, if it were not for a statement made twenty-five years ago by Dr. H. W. Wiley, now Chief of the Bureau of Chemistry of the Department of Agriculture, in a scientific paper, in which he gravely asserted: "In commercial honey which is entirely free from bee mediation, the comb is made of paraffin and filled with pure glucose by appropriate machinery. This honey, for whiteness and beauty, rivals the celebrated real white clover honey of Vermont, but can be sold at an immense profit at one half the price."

When Doctor Wiley's attention was originally called to his statement and its accuracy denied, he stated that when it was written it was "meant for a scientific pleasantry" and intimated that the bee keepers who resented it "undergo a certain cerebral inspiration which renders them incapable of seeing a joke." As the National Bee Keepers' Union did not appreciate his humor, but believed this to be a serious matter and one not to be trifled with, Mr. A. I. Root, of Medina, Ohio, at that time vice-president of the National Bee Keepers' Union, offered \$1,000 for a sample of manufactured honey in the comb, which drew from Doctor Wiley the statement that he had received the information on which he based his first statement from a Dr. E. J. Hallock, of Boston, who was, unfortunately, dead. Thus the statement of Doctor Wiley first made as a plain fact and then characterized as a scientific pleasantry, was subsequently claimed by him to have been made on the authority of a deceased chemist. Since that time, so far as known, Doctor Wiley has never corrected his statement about paraffin combs and artificial honey, but on the contrary, the statement, according to Doctor Wiley, "has appeared, I believe, in almost every publication in the country."

Because of the widespread publication of Doctor Wiley's statement and its incorporation in scientific works, both American and foreign, the honey men claim their business has been greatly injured, and to offset the effect of this "scientific pleasantry" have formed the Honey Producers' League to conduct a campaign of education. As the first step in this campaign a remarkable document is being circulated among Senators and members of Congress, giving a certain correspondence with Doctor Wiley, with comments thereon, and bearing the euphonious title of "The Wiley Honey Lie." Apparently the Honey Producers' League is a trifle sore on the eminent exploiter of the "poison squad," for in the "Honey Lie" appears the following language applied to Wiley:

"Therefore he 'knowingly, wilfully, and maliciously' lied out of the whole cloth, just to cause a sensation and to injure an honest pursuit. It is astonishing that any man could make such a barefaced confession without blushing for the very infamy it exhibited. To lie for the filthy lucre it brings is bad enough, but when he permits that lie to be copied all over the world and to be used to injure an honest business without making the least endeavor to arrest its evil effects by an honest contradiction, the crime is doubled."

Commenting on Doctor Wiley's statement, Professor Eaton, the well-known authority on pure food, is quoted in the "Honey Lie" as saying: "What is the cause of these unwise statements? First, perhaps, desire for publicity. Second, to alarm the public to a degree of food adulteration. Third, through ignorance."

According to those interested, the fight will be kept up, and if Doctor Wiley does not correct his statements he will have a posthumous reputation second only to that of Ananias. The Honey Producers' League was organized last year particularly to combat Doctor Wiley's statements. It is incorporated in Illinois and has headquarters in Chicago.

Meanwhile the National Bee Keepers' Union has a standing offer of \$1,000 to anyone who will produce 2 pounds of manufactured honey in the comb, as described by Doctor Wiley. This offer has been standing more than a year, but has never been claimed. As far as the records show, Doctor Wiley is the only one who knows anything about such imitation honey, and he obtained his information, so he says, from a chemist who, unfortunately, died twenty years ago, and who can not, therefore, substantiate Doctor Wiley's statements.

In this it is said that the bee keepers are doing this—distributing this. I have on file in the proper place—I could not bring them here to-day, because they are in another Department for another purpose—letters from the authorities of the bee keepers' association. I have evidence that there were brought to them at their meeting in Chicago last winter a large number of copies of this, with the request that they circulate them, and saying that they could have any number of copies if they could circulate them. I have evidence and men who can swear to it—giving the names of these two men who took this to the bee keepers' convention.

I have the indignant repudiation of the whole scheme by the bee keepers, saying that they knew it was loaded and calculated for some

improper purpose, as indicated in the subjoined letter of Mr. C. C. Miller:

MARENGO, ILL., February 12, 1906.

Prof. H. W. WILEY, *Government Chemist.*

DEAR SIR: I have heard that a pamphlet, entitled "The Wiley Honey Lie," has been distributed purporting to be by the authority of the Honey Producers' League.

At a meeting of the executive committee of the H. P. L. in Chicago last December a gentleman whose name I do not now recall appeared in company with Prof. E. N. Eaton, with copies of the pamphlet mentioned, and offered to furnish a large number of copies of the pamphlet free to the league if the league would allow the pamphlets to be distributed as if coming from the league.

No action looking in that direction was taken by the committee, and any statement or hint that said pamphlets are distributed by the authority or sanction of the league is entirely without authority.

Respectfully, yours,

C. C. MILLER,

President Honey Producers' League.

I dislike to bring this here to-day; it is personal. But I have been attacked personally, and I want to defend myself. I just want to leave these statements with you, gentlemen, because I know you are fair-minded men, and I know you know why there is such an activity in the public press just now, and thousands of these going to every paper in the country, and extracts from this document are circulated far and near. Some day I will know who printed it and who circulated it. That is certain. I will make no charges now, until the documents are properly in evidence. But it is for a purpose, Mr. Chairman.

This little discussion about *crème de menthe* does not amount to a row of pins. Of itself it would never have been brought before this committee. There is some purpose behind it. I will say here in Mr. Hough's presence—I have had very pleasant relations with him personally, and my relations are so yet, so far as personal relations are concerned; I don't like his way of doing business—that the effort is to discredit the efforts before the Congress to protect the American people against the adulteration of food products. That is the sole purpose. Look what it costs to carry these advertisements in all of the great dailies of the United States. It costs money to print 100,000 copies of this book (*The Wiley Lie*) and send it through the mails. It costs lots of money. Somebody is paying for it, and for some purpose. People do not spend their money for nothing in this country. They have a use for it.

I want you to consider that question and to consider the arguments that are made here to-day—not the arguments themselves, for they refute themselves, I think, but the purpose which lies behind these arguments. They say the law should be construed according to its spirit. I say a communication to this committee should be construed according to its spirit, and I have no doubt you will so construe it.

In regard to this matter of the food standards, I do not believe that it is necessary for me to go far into that, because the reception which has been accorded to these standards by everybody except those interested in breaking them down for sinister purposes has been most cordial. The most violent opponent to them is Mr. Eaton, of the State of Illinois, who is just now under fire and will probably be compelled to resign.

What is the truth about that Portland convention, that was mentioned here this morning? The Secretary of Agriculture told you

the exact truth about that convention—that is, if the secretary of the association himself knows anything about it, and members who attended it, who will confirm every word he said. That article in the Portland paper was set up, and I do not know but what it was printed, before the matter was brought to the convention. I have the whole thing here—the transcript of the proceedings. Mr. Eaton brought in his standards already printed—had an edition of 500, I think—and when the convention found out that he had done this they passed a resolution ordering every one of them to be destroyed, that they would have nothing whatever to do with any such standards as those.

And these discredited and burned standards are what this editorial refers to, the standards that were destroyed by the order of the convention; and members of the committee of which Doctor Eaton was chairman repudiated them and would not have anything to do with them. That is the story of the convention, and I have a list here, which I will file, of all of the States that have adopted these standards, not taken at random, but actual laws, either the laws adopting the standards by acts of the legislatures, or the food commissioner adopting them under authority of the legislature. Here is one, the rules and regulations of the food and dairy commissioners of the State of Idaho, from which I shall read you a provision:

Rules and regulations adopted by the State dairy, food, and oil commission of the State of Idaho.

The following standards of purity for food products are hereby issued for the use of the commissioner and chemists in the judging of the character of foods, and are published for the information of manufacturers and dealers. These standards include those specifically stated in the State food law entitled "An act regulating the manufacture and sale of dairy, food, and oil products, to prevent deception or fraud in the sale of the same or imitation thereof," and further include the standards and definitions authorized by the Department of Agriculture and the United States Pharmacopœia made legal in this State by the above mentioned food law, section 29, as adopted by the commission. Additional standards for foods not covered by the preceding, which have been adopted by the commission, are also included.

W. C. HOWIE, *Chairman,*

WILL H. GIBSON,

Prof. H. T. FRENCH,

State Dairy, Food, and Oil Commission.

BOISE, IDAHO, August 18, 1905.

A. F. HITT,

Boise, Idaho, Commissioner.

PROF. S. R. MACY,

Boise, Idaho, State Chemist.

Does that look like a repudiation of our standards? I would like Mr. Hough to point out just one standard which is unjust or unfair in those that have been used [handing paper to Mr. Hough].

MR. HOUGH. I have the address of Doctor Eaton here.

DOCTOR WILEY. Yes, sir; you have Doctor Eaton's address.

MR. HOUGH. Yes; in which he pointed out the defects in these standards.

DOCTOR WILEY. Mr. Eaton pointed them out, but what State authority has ever refused to adopt them? Is there a single standard given there which is not just? If that is true—and I do not say they are perfect standards and will not have to be amended some time as our knowledge increases—I say they were properly adopted.

Mr. Hough says that the national association of State dairy and food departments at Portland last year rejected the national standards and enacted a set of standards of their own. The facts in this case are shown in the following extract from a letter of the Secretary of Agriculture to Mr. Warwick M. Hough, dated November 1, 1905:

The St. Paul convention, on motion of A. H. Jones, State food commissioner of Illinois, adopted the following resolution: "That it be the sense of this association that when established by the Secretary of Agriculture the standards so far fixed by the official agricultural chemists be the standards fixed by this association."

The St. Paul convention also adopted the following resolution:

"Resolved, That the thanks of this association be tendered to the National Association of Official Agricultural Chemists for valuable assistance rendered us in our efforts to discover and establish proper standards for food and food products and in improving and unifying food analyses, and that we earnestly solicit their continued cooperation."

At the instance of the National Association of State Dairy and Food Departments the Louisiana Purchase Exposition by its president, its chairman of committee on congresses, and its director of congresses, called under the auspices of the National Association of State Dairy and Food Departments an international pure food congress of "officials in charge of the enforcement of laws that control the purity of food products, of chemists conducting investigations of food products, of manufacturers and dealers in foods, and of all persons engaged in the preservation and distribution of food products" to consider, among other subjects, "uniform standards for the quality and strength of dairy food and drink products." This congress assembled at the exposition during the week of September 26-October 1, 1904. The Congress had in attendance representatives from seven foreign governments, representatives from the United States Department of Agriculture, which is charged with the study of food adulteration and the enforcement of the United States food-inspection laws, representatives from the Association of Official Agricultural Chemists, the food-control officials from almost every State which has organized such a department, representatives from several of the national universities, representatives from the technical advisers of the food manufacturers, and representatives from almost every branch of the food and beverage manufacturing industry. Each subject in addition to the general discussion was considered by a separate committee appointed at the beginning of the congress, and the committee on standards reported the following resolution:

"Whereas the Association of State Dairy and Food Departments recommended by resolution at St. Paul last year that the standards being formulated by the committee appointed by the United States Secretary of Agriculture be recommended for adoption by the several departments,

"Be it resolved, That the commissioners and State analysts be urged to cooperate with the committee appointed by the Secretary of Agriculture in formulating these standards by furnishing all suggestions possible for the formation of an authoritative set of standards;

"And be it further resolved, That the different States and governments of the world be asked to cooperate in bringing about interstate and international uniformity of standards for the purity and quality of food substances."

Signed, M. A. Scovell, director and chemist of the Kentucky Agricultural Experiment Station and food commissioner of Kentucky; C. P. Sherwood, State dairy and food commissioner, South Dakota; H. E. Barnard, State analyst of New Hampshire, now State analyst of Indiana; R. G. Evans, advisory vice-president of the H. J. Heinz firm, Pittsburg, Pa.; H. W. Wiley, Chief Bureau of Chemistry, United States Department of Agriculture.

Mr. E. N. Eaton, State analyst of Illinois and member of the committee, did not sign this resolution and did not present a minority report.

This resolution was referred to the general committee on resolutions, was unanimously adopted by that committee without change, and was unanimously adopted by the congress. The general committee on resolutions consisted of J. W. Bailey, president of the association and chairman of the congress *ex officio*; Chevallier G. Rossatti, representative from Italy; A. H. Jones, commissioner from Illinois; M. A. Scovell, director Kentucky Experiment Station; H. W. Wiley, Chief United States Bureau of Chemistry; J. B. Noble, commissioner from Connecticut; Horace Ankeney, commissioner from Ohio; Albert

E. Leach, director laboratory Massachusetts State board of health; J. Q. Emery, commissioner from Wisconsin.

At the ninth annual convention of the National Association of State Dairy and Food Departments held at the Lewis and Clark Exposition, July 10-15, 1905, Mr. E. N. Eaton, of Illinois, presented a report on food standards. The report was published in a pamphlet entitled "Standards and Definitions of Food Products," for the National Association of State Dairy and Food Departments, suggested by the committee on revision of food standards. Edward N. Eaton, chairman, Illinois; A. L. Winton, Connecticut; E. F. Ladd, North Dakota; P. L. Hobbs, Ohio; Richard Fischer, Wisconsin. Subject to revision by the committee.

It was developed during the meeting that 500 copies of this report had been printed at the expense of the association; that no member of the association and none of the committee present whose names were given as having suggested the list of standards had seen a copy of the report until it was brought to the convention for adoption. Dr. A. L. Winton, of Connecticut, and Dr. Richard Fischer, of Wisconsin, the members of the committee present, stated that they had not suggested the standards attributed to them and that they emphatically opposed many of the standards printed in the report, and on motion of Mr. H. V. Tartar, State analyst of Oregon, the 500 copies of Mr. Eaton's published standards were ordered turned over to the executive committee to be destroyed, in order that the views of the various State analysts might not be misrepresented by the distribution of the published standards.

Prof. E. F. Ladd, food commissioner of North Dakota, whose name appears with the committee referred to above, writes me with reference to these standards, under date of August 25, as follows: "I regret that it was impossible for me to be present at the Portland convention. As soon as I learned of the set of standards I sent a letter of protest, addressed to Mr. Eaton at Portland. But it did not reach Portland in time to be delivered and has since been returned to me. I certainly could not indorse some of the standards as laid down in that (the Eaton) report. I never was consulted regarding the same, nor was I invited to attend a meeting of the committee, and I felt that an injustice had been done me in this report."

One of the things that has been charged against me is that I have changed my views on certain subjects, and I am glad to admit that I have, and I hope that I will continue to do so as long as I live, as soon as I am convinced my old views are incorrect. If I did not do that, I would want to be separated from all public service.

In regard to sulphurous acid, which has been spoken of as an instance of my changing my views, we adopted the French standards when we commenced to inspect foods, which the Paris municipality had adopted—and Paris is virtually France. It was not until we began to enforce their standard that they began to kick against it. They adopted a new standard, and then we adopted that, in part, to show that we had no ill feeling against them. We adopted first their old standard, and then when they made a new one we adopted that one in part.

MR. TRIMBLE. Referring to blended rectified whisky, have you ever made any analyses of it?

Doctor WILEY. Yes, sir; we have made many analyses—

MR. TRIMBLE. To find it deleterious?

Doctor WILEY. To find it deleterious? No, sir. We will soon publish the bulletin on straight whiskies—not the blends, because blends must be of two things of the same kind—of foreign imported whiskies in bond. We have about a thousand samples of whiskies, as I told the committee the other day. I do not want to interject the whisky question here, because it is not germane. Mr. Hough is fighting me because of these standards, in which he can not find a flaw, which are admitted in this country and are used in the English

courts to-day, and are cited there, not as legal authority, but as evidence in the courts.

"Suggestions to importers," which are not standards, contain at least one mistake as first published, as I have pointed out here, I am sorry to say. I made it myself. I confess it, Mr. Hough. I thought I was right when I said it; but I now know that I was wrong when I said what I did, and I take the first opportunity to correct it after I made it. This slip attached to this document you will find on every copy of it we send out. This is on "Food inspection decisions 1-25, June 1, 1905." The food standards are proclaimed by the Secretary of Agriculture under the authority of Congress.

We never have inspected a single article of imported whisky, except to get evidence, and not to detain them. We have never stopped any foreign brandy except when it is misbranded as to the country where it is made. We do not have to have a chemical examination as to that. And I make suggestions to importers so that they may have something to guide them when their goods come over here. We tell them about what we expect to do.

This correction slip reads:

In Food Inspection Decisions 1-25, June 1, 1905, pages 13 and 14 under paragraphs 5, 6, and 7, on fortified wines, brandy, and whisky, statements are made, in accordance with the opinion long held by chemists as correct, that these products should be "properly aged by storage in wood to eliminate the greater part of the fusel oils, etc., which may be present." Recent extensive investigations in the Bureau of Chemistry and elsewhere have shown that the fusel oils (higher alcohols) are not appreciably removed during the aging of whiskies and brandies, and that the improvement on aging is not due, as has been commonly supposed, to the oxidation of the higher alcohols.

There is the place we changed our views. The higher alcohols are not appreciably oxidized in the aging of whisky, and there is just as much of them in an old whisky, in proportion to the ethyl alcohol. So we had to change, and I hope we will continue to change whenever we learn we are wrong. That is the great danger of enacting a standard by law. If you enact a standard by law, and then it is wrong, you have to have a new enactment to correct your error. Standards should be set by competent authorities, and then construed by courts, and not made a matter of legislation. It is a dangerous thing to legislate that a thing should be so-and-so. But make it the best you can, and then let the courts construe it. That is the position in which this food-standard work is placed.

I will say just one word more. Mr. Hough said that the Secretary was not carrying out this law, because he did not personally consult these experts all over the country. You know it is impossible for the Secretary to go around the country and consult these experts. The food-standards committee often has hearing of a week at a time. Mr. Hough has been before the committee, and will be again, when, I have no doubt, he will discuss the standards of whisky, and all the experts of the trades will be called. We send the standards established to the trade broadcast, and ask them to criticise those standards. We say to them, "Is there anything in there which you object to? If so, make suggestions, so that we can improve them." We make every effort to get at the bottom facts underlying every one of these standards which has been proclaimed, and to give every opportunity to everyone engaged in a trade, and every manufacturer

and every merchant. Some of these standards may be wrong. I have no doubt that some of them are wrong. It is not human that they should not be. But they are as good as can be had with the light that we have; and we get it from everywhere. There can be no objection to these standards. Every country in the world has authorized similar standards.

The CHAIRMAN. Are they legalized in other countries?

Doctor WILEY. Some of them are and some of them are not.

The CHAIRMAN. Has any other country legalized standards?

Doctor WILEY. Yes, sir; some States.

The CHAIRMAN. I supposed that this was the object, to get these standards and agree upon them and have them legalized by the States, and prevent this division that exists among the chemists of the country.

Doctor WILEY. I have the official transcript of the laws adopted by several of the States, and others where they have been adopted by the food commissioners under the law. The food commissioners have authority in many of the States to adopt standards. I append letters which I have received from State commissioners—in answer to an inquiry—showing their attitude toward the standards which have been established.

WASHINGTON, D. C., *February 10, 1906.*

DEAR SIR: The following statement taken from *The Retailers' Journal* for February, 1906, page 27, is going the rounds of the press, and the part referring to food standards has been presented to the Committee on Agriculture of the House of Representatives by Mr. Warwick W. Hough:

"The State food commissioners who are giving their support to this bill (referring to the Lorimer bill, H. R. 13853) assert that no other national food law is needed. They declare, in addition, that Doctor Wiley's food standards are impractical, and assert in reply to the demand for uniform food standards that the commissioners of the various States which have pure-food laws already have under way plans to insure such uniformity in the State laws."

This matter will soon come up again before the Committee on Interstate and Foreign Commerce of the House, and I would like to get a statement over your own signature relating to the above matter, which may be presented to the committee.

In your opinion are the food standards as proclaimed by the Secretary of Agriculture impracticable?

I am sending you a copy of the food standards under separate cover.

The above question is asked simply for information, in order that we may know the exact status of the food commissioners, and is not asked for any purpose of securing any commendation of the standards already proclaimed by the Secretary of Agriculture further than the simple answer to the question above.

I am, respectfully,

H. W. WILEY.

* STATE OF WISCONSIN,
OFFICE OF DAIRY AND FOOD COMMISSION,
Madison, Wis., February 12, 1906.

HON. H. W. WILEY, *Washington, D. C.*

DEAR SIR: I am in receipt of yours of February 10. In reply, will say that at the St. Louis meeting of the National Association of State Dairy and Food Departments the following resolution was passed:

"Resolved, That the National Association of State Dairy and Food Departments, assembled at the eighth annual session, September 26 to October 1, 1904, at Congress Hall, on the St. Louis Purchase Exposition Grounds, at St. Louis, Mo., hereby records its indorsement of the Hepburn (Heyburn) pure-food bill, H. R. 6295, as passed January 19, 1904, by the National House of Representatives and most urgently requests the passage of the same by the United States Senate."

I understand that resolution to have committed the association named to the support of the bill specified in the resolution. I believe that the members of that association thought that bill might be improved by some amendments, but that association indorsed the salient principles and features of that bill.

If by the Lorimer bill (H. R. 13853) is meant the bill which has been referred to as the American Food Journal bill, then I must say that I am not in favor of the passage of that bill, and I have indicated the same to Mr. Eaton, chemist for the Illinois dairy and food commission, who has twice written me concerning the merits of that bill.

I favor the passage of a bill by Congress that shall authorize the fixing of food standards under authority of the United States Government. While the standards that have already been fixed under authority of the United States Government may in some particulars be improved and require modification as time passes, still I believe that pure-food laws will be more effective in securing the just purposes of such laws by having authority to fix food standards lodged in some administrative department of the United States Government. I fear that the depending upon States to fix food standards without such authority being vested in the United States Government will result in weak and ineffective results.

On this subject of national standards, I call your attention to the fact recorded on page 586 of the published proceedings of the National Association of State Dairy and Food Departments held at St. Paul, Minn., in 1903, that on a motion of Commissioner Jones from Illinois, "That it be the sense of this association that when established by the United States Secretary of Agriculture, these standards be the standards fixed by this association," that motion was seconded and carried.

The Heyburn bill, introduced into the present Congress, seems to me to be the best law that I have so far seen.

Very truly, yours,

J. Q. EMERY, *Commissioner.*

STATE OF IOWA, OFFICE OF DAIRY COMMISSIONER.
Des Moines, February 12, 1906.

Dr. H. W. WILEY, *Washington, D. C.*

DEAR SIR: I have at hand your letter of February 10, asking me specifically to state whether, in my opinion, the food standards, as proclaimed by the Secretary of Agriculture, are impractical.

So far as I am able to judge, these food standards, with two exceptions, are both accurate and practical. In my opinion the standard on butter should be 80 per cent butter fat, instead of 82½ per cent; and on milk should be 3 per cent butter fat, instead of 3½ per cent.

While the contents of your letter does not require further answer than is given above, I take this opportunity to state that I am a supporter of the Hepburn bill; that I consider national legislation, as comprehensive as the Hepburn bill, is necessary, both to cover the interstate-commerce features of food distribution (which can not be covered by State legislation) and to establish food standards, in order that uniformity of State standards may follow. I do not believe that uniformity of standards can be established by the States acting alone.

Yours, truly,

H. R. WRIGHT, *Dairy Commissioner.*

FEBRUARY 12, 1906.

Dr. H. W. WILEY,

United States Department of Agriculture, Washington, D. C.

DEAR DOCTOR WILEY: I have yours of the 10th, inquiring whether, in my opinion, the food standards proclaimed by the Secretary of Agriculture "are impractical."

I can best answer your question by saying that they have already been adopted for use, in connection with our food law, in this State, and we find them practical, helpful, and even necessary in our work, both in the execution of the law and in advising manufacturers of food products who wish to comply with the spirit as well as the letter of the law.

Very truly, yours,

E. H. JENKINS.

ROBINSON, ILL., February 12, 1906.

Dr. H. W. WILEY,

*Chief of the Bureau of Chemistry,**United States Department of Agriculture, Washington, D. C.*

DEAR SIR: Your letter of February 10 to hand, stating that the "State food commissioners who are giving their support to this bill (referring to the Lorimer bill, H. R. 13853) assert that no other national food law is needed, and they declare in addition that Doctor Wiley's food standards are impracticable, and assert in reply to the demand for uniform food standards that the commissioners of the various States which have pure-food laws already have under way plans to indorse such uniformity in the State laws."

In reply to same will say that I have never indorsed the "Lorimer bill" referred to. You will remember that I, along with Commissioner Hamilton, of Pennsylvania, Commissioner Blackburn, of Ohio, Commissioner Allen, of Kentucky, and Commissioner Noble, of Connecticut, along with yourself appeared before a committee of the House in support of a national food law.

For the past five years I have been a member of a special committee on legislation, appointed by the National Association of State Dairy and Food Departments to secure a national food law, and, as you know, have made several trips to Washington in the interest of the national law, and from all I can learn it seems that the present bill, which is being championed by Senators McCumber, of North Dakota, and Heyburn, of Idaho, and is commonly known as the "Hepburn-Heyburn-McCumber pure-food bill," has the best chance of passage of any of the other food bills.

I am in favor of it for the reason that it fixes and authorizes your Department to fix standards, make rulings, etc., so that the commissioners of the different States can recommend to their respective legislatures a similar law, and thus obtain a uniformity of rulings throughout the United States.

If there is anything I can do to assist in securing the passage of this bill I would take pleasure in cooperating with you in any way I can in the matter.

As you will see from my last annual report, that is now in the hands of the State printer of Illinois and will be ready for distribution about the 1st of April, I have substantially indorsed the standards fixed by the Department of Agriculture and embraced them and have had them printed in my annual report stating that they are the standards as adopted by the Bureau of Chemistry in the Department of Agriculture and promulgated by Secretary Wilson as the legal standards for the Department of Agriculture.

When the committee met at the Great Northern Hotel at Chicago last fall to fix standards I assured this committee of my sympathy with them in the work and that the Illinois commission would work in harmony with their committee.

I have no sympathy with the attack made upon you by the magazine or food journal called the "American Food Journal," published in Chicago.

As I wrote you some six months ago, I think you have brought about a great many reforms and accomplished a great deal and that you have done much to bring about a better condition of affairs in the food markets of the United States, and that you have guarded the interests of the people along food lines as faithfully as you could with the resources at your command.

I want to state further that Dr. E. N. Eaton, State chemist of Illinois, does not reflect my view in the "American Food Journal," referred to, nor in any of his interviews in regard to you or your position at the head of the Bureau of Chemistry.

I write you thus fully that you may understand the situation in Illinois, and want to assure you not only of my sympathy but support.

Sincerely, yours,

A. H. JONES.

STATE OF CONNECTICUT, DAIRY COMMISSIONERS' OFFICE,
Room 54, State Capitol, Hartford, February 14, 1906.

Hon. H. W. WILEY,

Department of Agriculture, Washington, D. C.

MY DEAR SIR: Your letter received. Regarding the food standards as proclaimed by the Secretary of Agriculture. You ask the following question: "In your opinion, are the food standards as proclaimed by the Secretary of Agriculture impractical?"

In answer to this question will say that we do not consider said food standards as impractical. So far as those standards have been proclaimed by the

Secretary of Agriculture they have been adopted as the food standards of our State, and in doing this we supposed and thought that we were adopting food standards that were practical.

Yours, very respectfully,

JOHN B. NOBLE

STATE BOARD OF HEALTH, SECRETARY'S OFFICE,
Brattleboro, Vt., February 13, 1906.

H. W. WILEY, M. D.,
Bureau of Chemistry, Agricultural Department, Washington, D. C.

MY DEAR DOCTOR WILEY: Yours of February 10, asking the opinion of this board with reference to the standard of pure foods established by the Department of Agriculture, is at hand. I have to say that our pure-food law has been in operation one year; that we adopted as our standard the standard of the Department, and it has worked entirely satisfactorily. We believe it is upon a correct basis, and trust that none other will be adopted in its stead.

Yours, truly,

HENRY D. HOLTON, *Secretary.*

STATE OF MINNESOTA, DAIRY AND FOOD DEPARTMENT,
St. Paul, February 13, 1906.

Mr. H. W. WILEY,
Bureau of Chemistry, United States Department of Agriculture,
Washington, D. C.

MY DEAR SIR: Replying to your favor of the 10th instant, I am very favorably impressed with the food standards as presented by your committee, and I feel that this work is in good hands.

I understand that these standards have been arranged by some of the leading chemists in the country, and while they may not be perfect I consider them more nearly so than anything else in the country.

Trusting this will be of service to you,

I remain, yours, truly,

EDWARD K. SLATER, *Commissioner.*

STATE OF INDIANA, STATE BOARD OF HEALTH,
Indianapolis, February 13, 1906.

Dr. H. W. WILEY,
Chief, Bureau of Chemistry, Washington, D. C.

DEAR SIR: I am in receipt of your letter of the 10th instant, inclosing statement taken from the Retailer's Journal for February, to the effect that the State food commissioners are giving their support to the Lorimer bill, and asserting that the standards of the Department of Agriculture are impracticable.

This statement is incorrect and conveys a wholly erroneous impression of the value of the present Government standards. The State board of health of Indiana has, within the last six months, adopted in full the standards proclaimed by the Secretary of Agriculture as official for the State. This action shows the opinion of the State board in regard to the practicability of the Government standards.

Very truly, yours,

J. N. HURTY,
Secretary, and State Food Commissioner.

STATE OF OHIO,
OFFICE OF DAIRY AND FOOD COMMISSIONER,
Columbus, February 13, 1906.

Prof. H. W. WILEY,
Chief of Bureau of Chemistry, Washington, D. C.

MY DEAR MR. WILEY: I have your letter of February 10, in which you refer to the article appearing in the Retailer's Journal which is going the rounds of the press, and which has been presented to the Committee on Agriculture of the House of Representatives by Mr. Hough. In reply I beg leave to say that

the bill referred to, which is known as the Lorimer bill, seems to be, as far as I can ascertain, a bill prepared by the chemist of the Illinois food department, viz, Mr. Eaton, who seems to have sent a copy to some of the commissioners, but none ever came to the Ohio commissioner for an opinion.

Who the State food commissioners are who are supporting this bill, I do not know. I think that the bulk of the food commissioners favor the Hepburn bill. As to the food standards, as claimed by the Secretary of Agriculture, while they may differ and do differ in one or two respects from the standards in this State (I have in mind, however, only the milk standard, which is a fraction higher than ours), they do not seem to me to be at all impracticable. It seems that the prediction that I made at Portland in my talk upon the national food law, viz, that the enemies of the bill would do all they could to distract the friends of the measure by having introduced various bills, has come true, and Mr. Hough will undoubtedly leave nothing undone to try to create the impression that the food commissioners are against the real measure.

Very truly, yours,

HORACE ANKENY, *Commissioner.*

COPY.

NEBRASKA FOOD COMMISSION,
Lincoln, Nebr., February 13, 1906.

Dr. H. W. WILEY, *Washington, D. C.*

DEAR SIR: Your favor of the 10th instant at hand, in regard to the food standards, and in reply would say that I think them perfectly practical.

The method of formulating these standards is certainly a commendable one, and the only feasible way to arrive at definite standards for the controlling of the sale of food products. I hope you will be successful in giving us a national food law this winter.

Very truly, yours,

W. F. THOMPSON.

THE STATE OF NEW HAMPSHIRE,
STATE BOARD OF HEALTH,
Concord, N. H., February 12, 1906.

Dr. H. W. WILEY, *Washington, D. C.*

MY DEAR DOCTOR: I am in receipt of your favor of February 10, and note the quotation which you take from the "The Retailers' Journal" for February, 1906, page 27, to wit: "The State food commissioners who are giving their support to this bill (referring to the Lorimer bill, H. R. 13853) assert that no other national food law is needed. They declare, in addition, that Doctor Wiley's food standards are impractical, and assert in reply to the demand for uniform food standards, that the commissioners of the various States which have pure-food laws already have under way plans to insure such uniformity in the State laws." My comment is that, in my opinion, this assertion is wholly without foundation.

If the various commissioners of the several States who have the pure-food laws to execute have plans under way to insure uniformity in the State laws, it is entirely unknown to this department. Inasmuch as we have a State laboratory of hygiene, and have been doing a large amount of food work for the past ten years, equaled by only a few States in the Union, I am of the opinion that if such a movement did exist we should be likely to have some knowledge of it.

We have long been of the opinion that the food standards proclaimed by the Department of Agriculture are as satisfactory as it is possible to establish, have adopted them in our work, and have even incorporated some of them in our State legislation.

I am fearful that the statement quoted is only another of many indirect attempts that are being made by interested parties to defeat a national pure-food law, which is so much to be desired, and without which the several States are powerless to enforce the pure-food laws within their own jurisdictions. It is absolutely impossible for the States to enforce their pure-food laws until some interstate-commerce regulations control the importation of adulterated foods into those States.

Very truly, yours,

IRVING A. WATSON, *Secretary.*

AGRICULTURAL EXPERIMENT STATION
OF THE STATE COLLEGE OF KENTUCKY,
Lexington, Ky., February 12, 1906.

Dr. H. W. WILEY,
Bureau of Chemistry, Washington, D. C.

DEAR SIR: I have your letter in regard to food standards adopted by the United States Department of Agriculture. I would say that I have charge of the enforcement of the food laws of our State, and I have been using and have adopted the food standards adopted by the United States Department of Agriculture. I find them excellent.

I believe the food laws of Kentucky are thoroughly executed, but it would be difficult to do so without the standards. I have no complaint from the manufacturers in regard to our enforcement of the law under the standards. They are just and explicit. I have also adopted the food inspection decisions of the United States Department of Agriculture wherever applying to our conditions.

In order to protect our retailers we need a national food law, but the Lorimer bill would be wholly inadequate.

Yours, very truly,

M. A. SCOVELL, *Director.*

So that I say if you leave it to the States, as Mr. Hough wants, and if you have also a national standard, then you would have two sets of standards, and if you leave it to each of the States you will have 45 sets of standards. The States are rapidly adopting these standards, and you will find when we are through with the work—and we are doing it as fast as we can—every State in the Union will adopt these standards, and thus we will have one uniform standard all over the country.

The CHAIRMAN. Will you state how many articles have been standardized in this work?

Doctor WILEY. I have a full list here which I brought for the committee.

The CHAIRMAN. Just read it.

Doctor WILEY. You would probably not want me to read all of it, Mr. Chairman, but I will give you a brief summary. I think it would be better to insert the full standards, and I submit them herewith.

UNITED STATES DEPARTMENT OF AGRICULTURE.

[Office of the Secretary.—Circular No. 13.]

STANDARDS OF PURITY FOR FOOD PRODUCTS.

(Superseding Circular No. 10.)

SUPPLEMENTAL PROCLAMATION.

Referring to my proclamation of November 21, 1903, the following food standards are hereby proclaimed as supplemental to standards proclaimed on the date above named.

JAMES WILSON, *Secretary.*

WASHINGTON, D. C., *December 20, 1904.*

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF CHEMISTRY,
Washington D. C., December 19, 1904.

The SECRETARY OF AGRICULTURE.

SIR: The undersigned, representing the Association of Official Agricultural Chemists of the United States, and commissioned by you, under authority given by the act of Congress, approved March 3, 1903, to collaborate with you "to establish standards of purity for food products and to determine what are regarded as adulterations therein, for the guidance of the officials of the various

States and of the courts of justice," respectfully submit herewith for your consideration standards for certain articles belonging to the schedules of grains and grain products, refiners' sirup, honey, wine, and vinegar, with the recommendation that they be approved and proclaimed the established standards.

In the expression of these standards, a form has been adopted more concise than that used in expressing the standards proclaimed November 21, 1903.

For the sake of uniformity in expression and interpretation, the committee has restated, without change in their matter, the standards proclaimed on the date above named, and recommends that they be published, together with the additional standards herewith submitted and the introductory statement of principles upon which the standards are based, in a circular superseding Circular No. 10, Office of the Secretary, United States Department of Agriculture.

For the primary standards in the schedule of wines the committee is greatly indebted to Chas. A. Crampton, M. D., chemist of the Bureau of Internal Revenue, referee on beverages, and for valuable assistance in reference to that schedule to W. D. Bigelow, Ph. D., chief of the Division of Foods, Bureau of Chemistry.

The several schedules of additional standards recommended have been submitted, in a tentative form, to the manufacturing firms and the trade immediately interested, and also to the State food control officials for criticism. Helpful suggestions and information have been received from many sources which will later be more specifically acknowledged.

Very respectfully,

WILLIAM FREAR.
E. H. JENKINS.
M. A. SCOVELL.
H. A. WEBER.
H. W. WILEY.

ORIGINAL PROCLAMATION OF STANDARDS AND LETTER OF TRANSMITTAL

[Circular No. 10, Secretary's Office.]

Whereas, The Congress of the United States by an act approved June 3, 1902, authorized the Secretary of Agriculture to establish standards of purity for food products; and

Whereas, He was empowered by this act to consult with the Committee on Food Standards of the Association of Official Agricultural Chemists and other experts in determining the standards; and

Whereas, He has in accordance with the provisions of the act availed himself of the counsel and advice of these experts and of the trade interests touching the products for which standards have been determined and has reached certain conclusions based on the general principles of examination and conduct hereinafter mentioned;

Therefore, I, James Wilson, Secretary of Agriculture, do hereby proclaim and establish the following standards for purity of food products together with their precedent definitions as the official standards of these food products for the United States of America.

JAMES WILSON.

WASHINGTON, D. C., November 21, 1903.

[United States Department of Agriculture, Bureau of Chemistry, Washington, D. C.]

THE SECRETARY OF AGRICULTURE OF THE UNITED STATES.

SIR: The undersigned, representing The Association of Official Agricultural Chemists of the United States, and commissioned by you, under authority given by the Act of Congress approved March 3, 1903, to collaborate with you "to establish standards of purity for food products and to determine what are regarded as adulterations therein, for the guidance of the officials of the various States and of the Courts of Justice," respectfully submit herewith, for your consideration, standards for certain articles belonging to the schedules of meat and the principal meat products, milk and its products, sugars and related substances, and condiments and cocoa and cocoa products, with the recommendation that they be approved and proclaimed the established standards.

In connection therewith are presented a classified list of the various schedules of food products for which standards are being prepared and a statement of some of the more important general principles upon which the standards are based.

Before the adoption of any schedule it was submitted to the manufacturing firms and the trade immediately interested for criticism, and, when requested by them, conferences for discussion have been arranged. Certain questions have arisen in the discussion of these standards relative to several substances sometimes used as preservatives or coloring matters. In the judgment of the committee these questions can most satisfactorily be treated in connection with Schedule III, Preservatives and Coloring Matters, and recommendations have therefore been deferred pending the consideration of that schedule.

For the primary definitions and standards and for the compilation of data for standards and constant assistance in the revision of the schedules, the committee is greatly indebted to the following persons: Charles D. Woods, Ph. D., director of the Maine Agricultural Experiment Station, Orono, Me., referee on meat and its products; L. L. Van Slyke, Ph. D., chemist of the New York Agricultural Experiment Station, Geneva, N. Y., referee on milk and its products; Charles A. Crampton, M. D., chemist of the Bureau of Internal Revenue, referee on beverages, including cocoa and cocoa products; A. L. Winton, Ph. B., chemist of the Connecticut Agricultural Experiment Station, New Haven, Conn., referee on condiments.

The committee is also indebted to others for information and helpful suggestions, which will be more specifically acknowledged in a report of its work to be later submitted.

Very respectfully,

WILLIAM FREAR.
EDWARD H. JENKINS.
MELVILL A. SCOVELL,
HENRY A. WEBER.
HARVEY W. WILEY.

PRINCIPLES ON WHICH THE STANDARDS ARE BASED.

The general considerations which have guided the committee in preparing the standards for food products are the following:

1. The standards are expressed in the form of definitions, with or without accompanying specifications of limit in composition.
2. The main classes of food articles are defined before the subordinate classes are considered.
3. The definitions are so framed as to exclude from the articles defined substances not included in the definitions.
4. The definitions include, where possible, those qualities which make the articles described wholesome for human food.
5. A term defined in any of the several schedules has the same meaning wherever else it is used in this report.
6. The names of food products herein defined usually agree with existing American trade or manufacturing usage, but where such usage is not clearly established or where trade names confuse two or more articles for which specific designations are desirable, preference is given to one of the several trade names applied.
7. Standards are based upon data representing materials produced under American conditions and manufactured by American processes or representing such varieties of foreign articles as are chiefly imported for American use.
8. The standards fixed are such that a departure of the articles to which they apply, above the maximum or below the minimum limit prescribed, is evidence that such articles are of inferior or abnormal quality.
9. The limits fixed as standard are not necessarily the extremes authentically recorded for the article in question, because such extremes are commonly due to abnormal conditions of production and are usually accompanied by marks of inferiority or abnormality readily perceived by the producer or manufacturer.

FOOD STANDARDS.

I. ANIMAL PRODUCTS.

A. MEATS AND THE PRINCIPAL MEAT PRODUCTS.

a. MEATS.

1. *Meat* is any sound, dressed, and properly prepared edible part of animals in good health at the time of slaughter. The term "animals," as herein used, includes not only mammals, but fish, fowl, crustaceans, mollusks, and all other animals used as food.

2. *Fresh meat* is meat from animals recently slaughtered or preserved only by refrigeration.

3. *Salted, pickled, and smoked meats* are unmixed meats preserved by salt, sugar, vinegar, spices, or smoke, singly or in combination, whether in bulk or in packages.

b. MANUFACTURED MEATS.

1. *Manufactured meats* are meats not included in paragraphs 2 and 3, whether simple or mixed, whole or comminuted, in bulk or packages, with or without the addition of salt, vinegar, spices, smoke, oils, or rendered fat. If they bear names descriptive of composition they correspond thereto and when bearing such descriptive names, if force or flavoring meats are used, the kind and quantity thereof are made known.

c. MEAT EXTRACTS, MEAT PEPTONES, ETC.

(Schedule in preparation.)

d. LARD.

1. *Lard* is the rendered fresh fat from slaughtered, healthy hogs, is free from rancidity, and contains not more than one (1) per cent of substances, other than fatty acids, not fat, necessarily incorporated therewith in the process of rendering.

2. *Leaf lard* is lard rendered at moderately high temperatures from the internal fat of the abdomen of the hog, excluding that adherent to the intestines, and has an iodine number not greater than sixty (60).

3. *Neutral lard* is lard rendered at low temperatures.

B. MILK AND ITS PRODUCTS.

a. MILKS.

1. *Milk (whole milk)* is the lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and five days after calving, and contains not less than twelve (12) per cent of total solids, not less than eight and one-half (8.5) per cent of solids not fat, and not less than three and one-quarter (3.25) per cent of milk fat.

2. *Blended milk* is milk modified in its composition so as to have a definite and stated percentage of one or more of its constituents.

3. *Skim milk* is milk from which a part or all of the cream has been removed, and contains not less than nine and one-quarter (9.25) per cent of milk solids.

4. *Buttermilk* is the product that remains when butter is removed from milk or cream in the process of churning.

5. *Pasteurized milk* is milk that has been heated below boiling but sufficiently to kill most of the active organisms present and immediately cooled to fifty degrees (50°) Fahr. or lower to retard the development of their spores.

6. *Sterilized milk* is milk that has been heated at the temperature of boiling water or higher for a length of time sufficient to kill all organisms present.

7. *Condensed milk* is milk from which a considerable portion of water has been evaporated, and contains not less than twenty-eight (28) per cent of milk solids, of which not less than one-fourth is milk fat.

8. *Sweetened condensed milk* is milk from which a considerable portion of water has been evaporated and to which sugar (sucrose) has been added, and

contains not less than twenty-eight (28) per cent of milk solids, of which not less than one-fourth is milk fat.

9. *Condensed skim milk* is skim milk from which a considerable portion of water has been evaporated.

b. MILK FAT OR BUTTER FAT.

1. *Milk fat or butter fat* is the fat of milk, and has a Reichert-Meissl number not less than twenty-four (24) and a specific gravity not less than 0.90 $\left(\frac{40^{\circ} \text{C.}}{40^{\circ} \text{C.}}\right)$

c. CREAM.

1. *Cream* is that portion of milk, rich in butter fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, and contains not less than eighteen (18) per cent of milk fat.

2. *Evaporated cream* is cream from which a considerable portion of water has been evaporated.

d. BUTTER.

1. *Butter* is the product made by gathering in any manner the fat of fresh or ripened milk or cream into a mass, which also contains a small portion of the other milk constituents, with or without salt, and contains not less than eighty-two and five-tenths (82.5) per cent of butter fat. By acts of Congress approved August 2, 1886, and May 9, 1902, butter may also contain additional coloring matter.

2. *Renovated or process butter* is the product made by melting butter and reworking, without the addition or use of chemicals or any substances except milk, cream, or salt, and contains not more than sixteen (16) per cent of water and at least eighty-two and five-tenths (82.5) per cent of butter fat.

e. CHEESE.

1. *Cheese* is the solid and ripened product made by coagulating the casein of milk by means of rennet or acids, with or without the addition of ripening ferments and seasoning. By act of Congress, approved June 6, 1896, cheese may also contain additional coloring matter.

2. *Whole milk or full cream cheese* is cheese made from milk from which no portion of the fat has been removed, and contains, in the water-free substance, not less than fifty (50) per cent of butter fat.

3. *Skim-milk cheese* is cheese made from milk from which any portion of the fat has been removed.

4. *Cream cheese* is cheese made from milk and cream, or milk containing not less than six (6) per cent of fat.

f. MISCELLANEOUS MILK PRODUCTS.

1. *Ice cream* (schedule in preparation).

2. *Whey* is the product remaining after the removal of fat and casein from milk in the process of cheese making.

3. *Kumiss* is the product made by the alcoholic fermentation of mare's or cow's milk with or without the addition of sugar (sucrose).

II. VEGETABLE PRODUCTS.

A. GRAIN PRODUCTS.

(a) GRAINS AND MEALS.

1. *Grain* is the fully matured, clean, sound, air-dry seed of wheat, maize, rice, oats, rye, buckwheat, barley, sorghum, millet, or spelt.

2. *Meal* is the sound product made by grinding grain.

3. *Flour* is the fine, sound product made by bolting wheat meal, and contains not more than thirteen and one-half (13.5) per cent of moisture, not less than one and twenty-five hundredths (1.25) per cent of nitrogen, not more than one (1.0) per cent of ash, and not more than fifty hundredths (0.50) per cent of fiber.

4. *Graham flour* is unbolted wheat meal.

5. "*Whole wheat flour*," "*entire wheat flour*," improperly so called, is fine wheat meal from which a part of the bran has been removed.

6. *Gluten flour* is the product made from flour by the removal of starch, and contains not less than five and six-tenths (5.6) per cent of nitrogen and not more than ten (10) per cent of moisture.

7. *Maize meal*, *corn meal*, or *Indian corn meal* is meal made from sound maize grain, and contains not more than fourteen (14) per cent of moisture, not less than one and twelve hundredths (1.12) per cent of nitrogen, and not more than one and six-tenths (1.6) per cent of ash.

8. *Rice* is the hulled and polished grain of *Oryza sativa*.

9. *Oatmeal* is meal made from hulled oats, and contains not more than eight (8) per cent of moisture, not more than one and five-tenths (1.5) per cent of crude fiber, not less than two and twenty-four hundredths (2.24) per cent of nitrogen, and not more than two and two-tenths (2.2) per cent of ash.

10. *Rye flour* is the fine sound product made by bolting rye meal, and contains not more than thirteen and one-half (13.5) per cent of moisture, not less than one and thirty-six hundredths (1.36) per cent of nitrogen, and not more than one and twenty-five hundredths (1.25) per cent of ash.

11. *Buckwheat flour* is bolted buckwheat meal, and contains not more than twelve (12) per cent of moisture, not less than one and twenty-eight hundredths (1.28) per cent of nitrogen, and not more than one and seventy-five hundredths (1.75) per cent of ash.

D. FRUITS AND VEGETABLES.

(Schedule in preparation.)

C. SUGARS AND RELATED SUBSTANCES.

a. SUGAR AND SUGAR PRODUCTS.

SUGARS.

1. *Sugar* is the product chemically known as sucrose (saccharose) chiefly obtained from sugar cane, sugar beets, sorghum, maple, or palm.

2. *Granulated*, *loaf*, *cut*, *milled*, and *powdered sugars* are different forms of sugar, and contain at least ninety-nine and five-tenths (99.5) per cent of sucrose.

3. *Maple sugar* is the solid product resulting from the evaporation of maple sap.

4. *Masseculite*, *melada*, *mush sugar*, and *concrete* are products made by evaporating the purified juice of a sugar-producing plant, or a solution of sugar, to a solid or semi-solid consistence, in which the sugar chiefly exists in a crystalline state.

MOLASSES AND REFINERS' SIRUP.

1. *Molasses* is the product left after separating the sugar from masseculite, melada, mush sugar, or concrete, and contains not more than twenty-five (25) per cent of water and not more than five (5) per cent of ash.

2. *Refiners' sirup* ("treacle") is the residual liquid product obtained in the process of refining raw sugars, and contains not more than twenty-five (25) per cent of water and not more than eight (8) per cent of ash.

SIRUPS.

1. *Sirup* is the product made by purifying and evaporating the juice of a sugar-producing plant without removing any of the sugar, and contains not more than thirty (30) per cent of water and not more than two and five-tenths (2.5) per cent of ash.

2. *Sugar-cane sirup* is sirup made by the evaporation of the juice of the sugar cane or by the solution of sugar-cane concrete.

3. *Sorghum sirup* is sirup made by the evaporation of sorghum juice or by the solution of sorghum concrete.

4. *Maple sirup* is sirup made by the evaporation of maple sap or by the solution of maple concrete.

5. *Sugar sirup* is sirup made by dissolving sugar to the consistence of a sirup.

b. GLUCOSE PRODUCTS.

1. *Starch sugar* is the solid product made by hydrolyzing starch or a starch-containing substance until the greater part of the starch is converted into dextrose. Starch sugar appears in commerce in two forms, anhydrous and hydrous. The former, crystallized without water of crystallization, contains not less than ninety-five (95) per cent of dextrose and not more than eight-tenths (0.8) per cent of ash. The latter, crystallized with water of crystallization, is of two varieties—70 sugar, also known as brewers' sugar, contains not less than seventy (70) per cent of dextrose and not more than eight-tenths (0.8) per cent of ash; 80 sugar, climax or acme sugar, contains not less than eighty (80) per cent of dextrose and not more than one and one-half (1.5) per cent of ash.

The ash of all these products consists almost entirely of chlorids and sulphates.

2. *Glucose, mixing glucose, or confectioner's glucose* is a thick, sirupy, colorless product made by incompletely hydrolyzing starch, or a starch-containing substance, and decolorizing and evaporating the product. It varies in density from forty-one (41) to forty-five (45) degrees Baumé at a temperature of one hundred (100) degrees F. (37.7° C.), and conforms in density, within these limits, to the degree Baumé it is claimed to show, and for a density of forty-one (41) degrees Baumé contains not more than twenty-one (21) per cent and for a density of forty-five (45) degrees not more than fourteen (14) per cent of water. It contains on a basis of forty-one (41) degrees Baumé not more than one (1) per cent of ash, consisting chiefly of chlorids and sulphates.

3. *Glucose sirup or corn sirup* is glucose unmixed or mixed with sirup, molasses, or refiners' sirup and contains not more than twenty-five (25) per cent of water and not more than three (3) per cent of ash.

c. CANDY.

1. *Candy* is a product made from a saccharine substance or substances with or without the addition of harmless coloring, flavoring, or filling materials and contains no terra alba, barytes, talc, chrome yellow, or other mineral substances, or poisonous colors or flavors, or other ingredients injurious to health.

d. HONEY.

1. *Honey* is the nectar and saccharine exudations of plants gathered, modified, and stored in the comb by honey bees (*Apis mellifica*). It is levorotatory, contains not more than twenty-five (25) per cent of water, not more than twenty-five hundredths (0.25) per cent of ash, and not more than eight (8) per cent of sucrose.

2. *Comb honey* is honey contained in the cells of comb.

3. *Extracted honey* is honey which has been separated from the uncrushed comb by centrifugal force or gravity.

4. *Strained honey* is honey removed from the crushed comb by straining or other means.

D. CONDIMENTS (EXCEPT VINEGAR).

a. SPICES.

1. *Spices* are aromatic vegetable substances used for the seasoning of food and from which no portion of any volatile oil or other flavoring principle has been removed and which are sound and true to name.

2. *Allspice or pimento* is the dried fruit of *Pimenta pimenta* (L.) Karst. and contains not less than eight (8) per cent of quercitannic acid; not more than six (6) per cent of total ash; not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than twenty-five (25) per cent of crude fiber.

3. *Anise* is the fruit of *Pimpinella anisum* L.

4. *Bay leaf* is the dried leaf of *Laurus nobilis* L.

5. *Capers* are the flower buds of *Capparis spinosa* L.

6. *Caraway* is the fruit of *Carum carvi* L.

* Calculated from the total oxygen absorbed by the aqueous extract.

CAYENNE AND RED PEPPERS.

7. *Red pepper* is the dried ripe fruit of any species of *Capsicum*.
8. *Cayenne pepper* or *cayenne* is the dried ripe fruit of *Capsicum frutescens* L., *Capsicum baccatum* L., or some other small-fruited species of *Capsicum*, and contains not less than fifteen (15) per cent of nonvolatile ether extract; not more than six and five-tenths (6.5) per cent of total ash; not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid; not more than one and five-tenths (1.5) per cent of starch, and not more than twenty-eight (28) per cent of crude fiber.
9. *Celery seed* is the dried fruit of *Apium graveolens* L.
10. *Cinnamon* is the dried bark of any species of the genus *Cinnamomum* from which the outer layers may or may not have been removed.
11. *True cinnamon* is the dried inner bark of *Cinnamomum zeylanicum* Breyn.
12. *Cassia* is the dried bark of various species of *Cinnamomum*, other than *Cinnamomum zeylanicum*, from which the outer layers may or may not have been removed.
13. *Cassia buds* are the dried immature fruit of species of *Cinnamomum*.
14. *Ground cinnamon* or *ground cassia* is a powder consisting of cinnamon, cassia, or cassia buds, or a mixture of these spices, and contains not more than eight (8) per cent of total ash and not more than two (2) per cent of sand.
15. *Cloves* are the dried flower buds of *Caryophyllus aromaticus* L. which contain not more than five (5) per cent of clove stems; not less than ten (10) per cent of volatile ether extract; not less than twelve (12) per cent of quercitannic acid; * not more than eight (8) per cent of total ash; not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than ten (10) per cent of crude fiber.
16. *Coriander* is the dried fruit of *Coriandrum sativum* L.
17. *Cumin seed* is the fruit of *Cuminum cyminum* L.
18. *Dill seed* is the fruit of *Anethum graveolens* L.
19. *Fennel* is the fruit of *Feniculum feniculum* (L.) Karst.
20. *Ginger* is the washed and dried or decorticated and dried rhizome of *Zingiber zingiber* (L.) Karst., and contains not less than forty-two (42) per cent of starch, not more than eight (8) per cent of crude fiber, not more than eight (8) per cent of total ash, not more than one (1) per cent of lime, and not more than three (3) per cent of ash insoluble in hydrochloric acid.
21. *Limed or bleached ginger* is whole ginger coated with carbonate of lime and contains not more than ten (10) per cent of ash, not more than four (4) per cent of carbonate of lime, and conforms in other respects to the standard for ginger.
22. *Horse-radish* is the root of *Roripa armoracia* (L.) Hitchcock either by itself or ground and mixed with vinegar.
23. *Mace* is the dried arillus of *Myristica fragrans* Houttuyn and contains not less than twenty (20) nor more than thirty (30) per cent of nonvolatile ether extract, not more than three (3) per cent of total ash, not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than ten (10) per cent of crude fiber.
24. *Macassar* or *Papua mace* is the dried arillus of *Myristica argentea* Warb.
25. *Bombay mace* is the dried arillus of *Myristica malabarica* Lamarck.
26. *Marjoram* is the leaf, flower, and branch of *Majorana majorana* (L.) Karst.
27. *Mustard seed* is the seed of *Sinapis alba* L. (white mustard), *Brassica nigra* (L.) Koch (black mustard), or *Brassica juncea* (L.) Cosson (black or brown mustard).
28. *Ground mustard* is a powder made from mustard seed, with or without the removal of the hulls and a portion of the fixed oil, and contains not more than two and five-tenths (2.5) per cent of starch and not more than eight (8) per cent of total ash.
29. *Nutmeg* is the dried seed of *Myristica fragrans* Houttuyn deprived of its testa, with or without a thin coating of lime, and contains not less than twenty-five (25) per cent of nonvolatile ether extract, not more than five (5) per cent of total ash, not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than ten (10) per cent of crude fiber.
30. *Macassar, Papua, male, or long nutmeg* is the dried seed of *Myristica argentea* Warb. deprived of its testa.
31. *Paprika* is the dried ripe fruit of *Capsicum annum* L., or some other large-fruited species of *Capsicum*.

* Calculated from the total oxygen absorbed by the aqueous extract.

PEPPER.

32. *Black pepper* is the dried immature berry of *Piper nigrum* L. and contains not less than six (6) per cent of nonvolatile ether extract, not less than twenty-five (25) per cent of starch, not more than seven (7) per cent of total ash, not more than two (2) per cent of ash insoluble in hydrochloric acid, and not more than fifteen (15) per cent of crude fiber. One hundred parts of the nonvolatile ether extract contain not less than three and one-quarter (3.25) parts of nitrogen. *Ground black pepper* is the product made by grinding the entire berry and contains the several parts of the berry in their normal proportions.

33. *Long pepper* is the dried fruit of *Piper longum* L.

34. *White pepper* is the dried mature berry of *Piper nigrum* L., from which the outer coating or the outer and inner coatings have been removed and contains not less than six (6) per cent of nonvolatile ether extract, not less than fifty (50) per cent of starch, not more than four (4) per cent of total ash, not more than five-tenths (0.5) per cent of ash insoluble in hydrochloric acid, and not more than five (5) per cent of crude fiber. One hundred parts of the nonvolatile ether extract contain not less than four (4) parts of nitrogen.

35. *Saffron* is the dried stigma of *Crocus sativus* L.

36. *Sage* is the leaf of *Salvia officinalis* L.

37. *Savory* or *summer savory* is the leaf, blossom, and branch of *Satureja hortensis* L.

38. *Thyme* is the leaf and tip of blooming branches of *Thymus vulgaris* L.

B. FLAVORING EXTRACTS.

(Schedule in preparation.)

C. EDIBLE VEGETABLE OILS.

(Schedule in preparation.)

D. SALT.

(Schedule in preparation.)

E. BEVERAGES AND VINEGAR.

A. TEA.

(Schedule in preparation.)

B. COFFEE.

(Schedule in preparation.)

C. COCOA AND COCOA PRODUCTS.

1. *Cocoa beans* are the seeds of the cacao tree, *Theobroma cacao* L.

2. *Cocoa nibs*, or *cracked cocoa*, is the roasted, broken cocoa bean freed from its shell or husk.

3. *Chocolate*, *plain* or *bitter*, or *chocolate liquor*, is the solid or plastic mass obtained by grinding cocoa nibs without the removal of fat or other constituents except the germ, and contains not more than three (3) per cent of ash insoluble in water, three and fifty hundredths (3.50) per cent of crude fiber, and nine (9) per cent of starch, and not less than forty-five (45) per cent of cocoa fat.

4. *Sweet chocolate* and *chocolate coatings* are plain chocolate mixed with sugar (sucrose), with or without the addition of cocoa butter, spices, or other flavoring materials, and contain in the sugar and fat free residue no higher percentage of either ash, fiber, or starch than is found in the sugar and fat free residue of plain chocolate.

5. *Cocoa* or *powdered cocoa* is cocoa nibs, with or without the germ, deprived of a portion of its fat and finely pulverized, and contains percentages of ash, crude fiber, and starch corresponding to those in chocolate after correction for fat removed.

6. *Sweet* or *sweetened cocoa* is cocoa mixed with sugar (sucrose), and contains not more than sixty (60) per cent of sugar (sucrose), and in the sugar and fat free residue no higher percentage of either ash, crude fiber, or starch than is found in the sugar and fat free residue of plain chocolate.

d. FRUIT JUICES—FRESH, SWEET, AND FERMENTED.

1. FRESH AND 2. SWEET.

(In preparation.)

3. FERMENTED FRUIT JUICES.

1. *Wine* is the product made by the normal alcoholic fermentation of the juice of sound, ripe grapes and the usual cellar treatment,* and contains not less than seven (7) nor more than sixteen (16) per cent of alcohol, by volume, and in one hundred (100) cubic centimeters, not more than one-tenth (0.1) gram of sodium chlorid nor more than two-tenths (0.2) gram of potassium sulphate, and for red wine not more than fourteen hundredths (0.14) gram, and for white wine not more than twelve hundredths (0.12) gram of volatile acids derived from fermentation and calculated as acetic acid. *Red wine* is wine containing the red coloring matter of the skins of grapes. *White wine* is wine made from white grapes or the expressed fresh juice of other grapes.

2. *Dry wine* is wine in which the fermentation of the sugars is practically complete and which contains, in one hundred (100) cubic centimeters, less than one (1) gram of sugars, and for dry red wine not less than sixteen hundredths (0.16) gram of grape ash and not less than one and six-tenths (1.6) grams of grape solids, and for dry white wine not less than thirteen hundredths (0.13) gram of grape ash and not less than one and four-tenths (1.4) grams of grape solids.

3. *Fortified dry wine* is dry wine to which brandy has been added, but which conforms in all other particulars to the standard of dry wine.

4. *Sweet wine* is wine in which the alcoholic fermentation has been arrested, and which contains, in one hundred (100) cubic centimeters, not less than one (1) gram of sugars, and for sweet red wine not less than sixteen hundredths (0.16) gram of grape ash, and for sweet white wine not less than thirteen hundredths (0.13) gram of grape ash.

5. *Fortified sweet wine* is sweet wine to which wine spirits have been added. By act of Congress "sweet wine," used for making fortified sweet wine, and "wine spirits," used for such fortification, are defined as follows (sec. 43, act of October 1, 1890, 26 Stat., 567, as amended by section 68, act of August 28, 1894, 28 Stat., 509): That the wine spirits mentioned in section forty-two of this act is the product resulting from the distillation of fermented grape juice and shall be held to include the product commonly known as grape brandy; and the pure sweet wine which may be fortified free of tax, as provided in said section, is fermented grape juice only, and shall contain no other substance of any kind whatever introduced before, at the time of, or after fermentation, and such sweet wine shall contain not less than four per centum of saccharine matter, which saccharine strength may be determined by testing with Balling's saccharometer, or must scale, such sweet wine, after the evaporation of the spirit contained therein, and restoring the sample tested to original volume by addition of water: *Provided*, That the addition of pure boiled or condensed grape must, or pure crystallized cane or beet sugar to the pure grape juice aforesaid, or the fermented product of such grape juice, prior to the fortification provided for by this act for the sole purpose of perfecting sweet wines according to commercial standard, shall not be excluded by the definition of pure, sweet wine aforesaid: *Provided further*, That the cane or beet sugar so used shall not be in excess of ten per cent of the weight of wines to be fortified under this act.

6. *Sparkling wine* is wine in which the after part of the fermentation is completed in the bottle, the sediment being disgorged and its place supplied by wine or sugar liquor, and which contains, in one hundred (100) cubic centimeters, not less than twelve hundredths (0.12) gram of grape ash.

7. *Sugar wine* is the product made by the addition of sugar to the juice of sound ripe grapes and subsequent alcoholic fermentation, with the usual cellar treatment.

8. *Raisin wine* is the product made by the alcoholic fermentation of an infusion of dried or evaporated grapes, or of a mixture of such infusion or raisins with grape juice.

* The subject of sulphurous acid in wine is reserved for consideration in connection with the schedule Preservatives and Coloring Matters.

e. VINEGAR.

1. *Vinegar, cider vinegar, or apple vinegar* is the product made by the alcoholic and subsequent acetous fermentations of the juice of apples, is levo-rotatory, and contains not less than four (4) grams of acetic acid, not less than one and six-tenths (1.6) grams of apple solids, and not less than twenty-five hundredths (0.25) gram of apple ash in one hundred (100) cubic centimeters. the water-soluble ash from one-hundred (100) cubic centimeters of the vinegar requires not less than thirty (30) cubic centimeters of decinormal acid to neutralize the alkalinity, and contains not less than ten (10) milligrams of phosphoric acid (P_2O_5).

2. *Wine vinegar or grape vinegar* is the product made by the alcoholic and subsequent acetous fermentations of the juice of grapes, and contains, in one hundred (100) cubic centimeters, not less than (4) grams of acetic acid, not less than one and four-tenths (1.4) grams of grape solids, and not less than thirteen hundredths (0.13) grams of grape ash.

3. *Malt vinegar* is the product made by the alcoholic and subsequent acetous fermentations, without distillation, of an infusion of barley malt or cereals whose starch has been converted by malt, and is dextro-rotatory, and contains in one hundred (100) cubic centimeters, not less than four (4) grams of acetic acid, not less than two (2) grams of solids, and not less than two-tenths (0.2) gram of ash. The water-soluble ash from one hundred (100) cubic centimeters of the vinegar requires not less than four (4) cubic centimeters of decinormal acid to neutralize its alkalinity, and contains not less than nine (9) milligrams of phosphoric acid (P_2O_5).

4. *Sugar vinegar* is the product made by the alcoholic and subsequent acetous fermentations of solutions of a sugar, sirup, molasses, or refiners' sirup, and contains, in one hundred (100) cubic centimeters, not less than four (4) grams of acetic acid.

5. *Glucose vinegar* is the product made by the alcoholic and subsequent acetous fermentations of solutions of tarch ugar, glucose, or glucose sirup, is dextro-rotatory, and contains, in one hundred (100) cubic centimeters, not less than four (4) grams of acetic acid.

6. *Spirit vinegar, distilled vinegar, grain vinegar* is the product made by the acetous fermentation of dilute distilled alcohol, and contains, in one hundred (100) cubic centimeters, not less than four (4) grams of acetic acid.

f. MEAD, BOOT BEER, ETC.

(Schedule in preparation.)

g. MALT LIQUORS.

(Schedule in preparation.)

h. SPIRITUOUS LIQUORS.

(Schedule in preparation.)

i. CARBONATED WATERS, ETC.

(Schedule in preparation.)

III. PRESERVATIVES AND COLORING MATTERS.

(Schedule in preparation.)

Vegetable oils and salt: We have standards for salt. We find the greatest difference in the salt offered our dairymen for salting their butter and for family use, and there should be some standard for salt, so that we can know what we are getting. Then come beverages. We have not done anything on that. The greatest danger that threatens us is still in the remote future, evidently; and you can only judge of the future by the work that has been done.

I will ask this committee if there is any danger to any honest tradesman in these standards, made without any bias on the part of the committee of chemists in favor of this, that, or the other—abso-

lutely unbiased—only seeking to get at the facts. Under beverages we have not sent out anything for beer. Wine we have standardized. That is the only beverage we have standardized, except, I believe, cider. Then comes cocoa and cocoa butter; juices of fruits, fresh, sweet, and fermented; we have standards for those.

The CHAIRMAN. How many States have legalized those, so far?

Doctor WILEY. I think three have adopted them. Some States authorize their commissioners to fix standards.

The CHAIRMAN. By authority of the legislature?

Doctor WILEY. Yes, sir; but some have enacted these laws themselves. I have a list showing the action of every State in which any action has been taken at all, which is in this document which I will file with you.

STATE FOOD STANDARDS.

In the following States the authority charged with the enforcement of the food laws is authorized by statute to establish standards:

Connecticut.—"The said experiment station may fix standards of purity, quality, or strength when such standards are not specified by law." (General Statutes 1902, ch. 153, pp. 664-666.)

Indiana.—"Within ninety days after the passage of this act, the State board of health shall adopt such measures as may be necessary to facilitate the enforcement thereof, and shall prepare rules and ordinances where and when necessary regulating minimum standards for foods and drugs, defining specific adulteration and declaring the proper methods of collecting and examining drugs and articles of food." (Horner's Annotated Statutes, 1901, vol. 2, sec. 50001.)

Kentucky.—"The director of said station is hereby empowered to adopt and fix standards of purity, quality, or strength, when such standards are not specified or fixed by statute." (Stats., 1903, ch. 53A, pp. 769-772.)

Maine.—"Said director may also adopt or fix standards of purity, quality, or strength when such standards are not specified or fixed by law, and shall publish them, together with such other information concerning articles of food as may be of public benefit." (Public Laws, 1905, ch. 68, pp. 68-70.)

North Dakota.—"The said station may adopt or fix standards of purity, quality, or strength when such standards are not specified or fixed by statute." (Laws of 1903, ch. 6, p. 9.)

Nebraska.—"The said food commissioner * * * shall have power to establish a minimum standard of butter fat in milk and cream." (Compiled Stats., 1903, ch. 33, pp. 900-904.)

Texas.—"The State health officer shall also, from time to time, fix the limits of variability permissible in any article of food or drug or compound, the standard of which is not established by any national pharmacopoeia." (Wilson's Crim. Stats., 1906, Penal Code, title 12, ch. 2, pp. 165-168.)

Of the above States, the executive officers in Kentucky and Nebraska established standards in 1900 and 1901, respectively, before the adoption of standards by the Secretary of Agriculture, and have not materially altered them since. The executive officer in Connecticut adopted the standards of the United States Department of Agriculture as soon as they were established, and Maine adopted the same standards immediately on the passage of the law of that State. Indiana also adopted the standards of the United States Department of Agriculture as soon as inspection in that State was begun. In North Dakota many of the standards are fixed by statute. Changes that have recently been made in the regulations of the commissioner have been in the direction of bringing those regulations more into harmony with those of the Department of Agriculture.

In the following States the laws themselves recognize the standards of the Department of Agriculture, or provide that standards may be adopted by the executive officer of the State which must be in harmony with the standards of that Department.

Idaho.—"The State board of dairy, food, and oil commissioners shall have the authority from time to time to establish standards of strength and purity not designated in this act, said standards to be in harmony with the standards authorized by the United States Department of Agriculture or by the United

States Pharmacopœia, as the case may be." (Laws of 1905, House bill No. 06, pp. 54-67.)

Missouri.—"In all prosecutions and proceedings for the enforcement in any of the courts in this State, of all laws and regulations of whatsoever nature now in force, or that hereafter be enacted pertaining to the production, sale, and distribution of dairy products of any kind whatsoever, the standards of purity and the definition of said products shall be such as are now, or may hereafter be, adopted, recognized, and published by the officials of the United States Department of Agriculture." (Laws of 1905 (H. B. 300), sec. 5, pp. 133-135.) Food inspection in this State does not extend to other foods than dairy products.

North Carolina.—"The board of agriculture shall also from time to time fix and publish the limits of variability permissible in any article of food, beverage, or condiment, and these standards when so published shall remain the standards before all courts: *Provided*, That when standards have been or may be fixed by the Secretary of Agriculture of the United States, they shall be accepted by the board of agriculture and published as the standards of North Carolina." (Laws of 1899, ch. 86, sec. 8, p. 216.)

Vermont.—"The standard of purity for food products shall be that adopted by the United States Department of Agriculture." (Laws of 1904, No. 143, sec. 21, pp. 198-202.)

Virginia.—"The board of agriculture shall also from time to time fix and publish the limits of variability permissible in any article of food, beverage, or condiment, and these standards, when so published, shall remain the standards before all courts: *Provided*, That when standards have or may be fixed by the Secretary of Agriculture of the United States they shall be accepted by the board of agriculture and published as the standards of Virginia." (Acts of Assembly 1899-1900, ch. 655, sec. 8, pp. 694-697.)

In the following States the executive officer is not authorized to establish standards, but has issued rules and regulations, including standards permissible to inform those interested of his interpretation of the law. With the exception of South Dakota, those standards have not been materially altered since their original adoption. It will be noted that in all the following States, except Utah, the rulings of the executive officer were adopted before the standards of the committee of the Department of Agriculture were established.

Illinois.—Adopted prior to 1903.

Kansas.—The standards adopted are those of the United States Department of Agriculture.

Michigan.—Adopted prior to 1903.

Pennsylvania.—These regulations were adopted prior to 1903. Regulation No. 3 provides that "Where no standard of strength, quality, or purity is fixed by law, the standard required shall be that adopted by the highest recognized authorities, such as the United States Pharmacopœia, or the Association of Official Agricultural Chemists."

South Dakota.—These regulations were adopted prior to 1903, but have been changed to some extent since then. The standards for cream and cheese have been made like those of the Department of Agriculture. None of the changes made are in the opposite direction.

Utah.—The law of Utah was approved March 9, 1905. The commissioner has adopted a portion of the regulations of the Pennsylvania commissioner, including No. 3, which is quoted above.

Washington.—Adopted prior to 1903. "These rulings must not be considered as law, but as an interpretation of the law by the commissioner."

Wisconsin.—Adopted prior to 1903.

Food laws are enforced in the following States, but no standards have been adopted other than those established in the laws: District of Columbia, Minnesota, Massachusetts.

New Hampshire.—Authorized to make regulations (standards not specified).

New Jersey.—Authorized to make regulations (standards not specified).

New York.—State board of health authorized to make regulations. The food work of the State, however, is conducted by the State department of agriculture.

Mr. HENRY. Will you tell the committee the names of the committee who did this standardizing work?

Doctor WILEY. Yes, sir. This committee was originally appointed by the Association of Official Agricultural Chemists, representing all

the experiment stations and agricultural colleges, boards of health, and all bodies having official control of any food products—foods and beverages. Its history is given herewith.

History of committee on food standards, association of official agricultural chemists.

[1896. (Twelfth Annual Convention, Bul. 47, p. 129.)]

Motion by Dr. L. L. Van Slyke, Geneva, N. Y., a committee of three on pure food legislation to be appointed. (On suggestion of A. S. Mitchell, of Milwaukee, Wis.)

Mr. Ross, incoming president, appointed Messrs. Wiley, Huston, Myers, and Mitchell.

[1898. (Fourteenth Annual Convention, Bul. 51, p. 139.)]

The committee on recommendations of referees recommended that "the report of the referee on food adulterations and standards of purity and the whole subject of food adulterations, including dairy products, be referred to a committee of five, to be appointed by the incoming president, such committee to have subcommittees, and to refer methods and standards to the next meeting of the association."

The president-elect, Mr. A. L. Winton, New Haven, Conn., named Messrs. Wiley, Weber, Scovell, Jenkins, and Frear, which committee has continued until the present time, with the exception that in 1900 Mr. Frear took the chairmanship, Mr. Wiley resigning.

In 1903 the Food Standards Committee was officially recognized by Congress, the following clause being inserted in the appropriation bill: "To enable the Secretary of Agriculture, in collaboration with the Association of Official Agricultural Chemists, and such other experts as he may deem necessary, to establish standards of purity for food products and to determine what are regarded as adulterations therein."

(The committee on recommendations, 1898, which made the recommendation creating the committee on food standards, was composed of the following members: Messrs. Bartlett, Wheeler, Scovell, Van Slyke, and Hite.)

We have an annual meeting of this association in Washington. This commission was appointed years ago, before we asked any authority of Congress to do the work, just as an investigating committee. It was recommissioned, on the passage of this law, by the Secretary of Agriculture, and each member of that committee has a commission from the Secretary of Agriculture making him a member of the Department of Agriculture and allowing him \$10 a day and traveling expenses for his services when he is at work. They usually work 15 days a year, and the average pay is about \$150 a year; mighty poor pay for the good work they do. William Frear, assistant director of the Pennsylvania State Agricultural Experiment Station, State College, Pa., M. A. Scovell, chemist and director of the Agricultural Station of Kentucky, Lexington, Ky., H. A. Weber, professor of agricultural chemistry in the University of Ohio, Columbus, Ohio, E. H. Jenkins, director of the Agricultural Experiment Station of Connecticut, New Haven, Conn., and myself, make up this committee.

That committee has consulted many experts on everyone of these schedules, as our records will show. We take no snap judgment on anybody. We submit everything tentatively for discussion, and if we think we are wrong in our tentative standards we change them to conform to the truth and the facts of the case. I do not think that any country has ever taken the trouble to get at the very bottom fact of standardizing foods as we are doing here, and the standards which

are authorized, and which Mr. Hough says were adopted by the association at Portland, were written by one man sitting in his own office.

Now, Mr. Chairman, which set of standards would you suppose the States would adopt, and which would have the greater authority among the people of this country? There is only one answer to that question. I do not care if Doctor Eaton was the most talented man in the world. With all the information he could get he could not set standards in his own room which would compare in value and efficiency with those which this committee, with great laboriousness and time, are attempting to establish with the authority and consent of Congress.

And when they are established, are they law? No, sir. Manufacturers may come and say, "We can not conform to the standards." Well, they can appeal to the courts. These standards are founded upon justice and knowledge of composition, and as such can be construed as the court will direct, and nothing more. Now, do not stop this good work at the behest of the National Liquor Dealers' Association or any other body that comes here and asks you for it.

I will say but just one or two words more. I would like to read you extracts from this great trial that is going on in London as to what whisky is. Mr. Hough has all those documents, and he knows how interesting that is. I want just to read one thing more and then I am done. This is very short. I am only calling your attention to the things presented to you this morning.

Mr. Hough says that he is in favor of the pure-food law, and so is his association. I just want to call your attention to a circular of this association, signed by its secretary and president, issued on the 20th of December, 1904, which reads as follows:

Congress is now in session. Conditions require us to be watchful of trade interests, and our best efforts are being exerted in your behalf.

The association has accomplished a great deal for the entire trade. Unaided it secured in 1903 the passage of the outage bill, extending the outage allowance on distilled spirits from four to seven years. It has prevented the passage of the Hepburn-Dolliver prohibition bill, aiming at national prohibition, and the McCumber substitute for the Hepburn pure-food bill, containing certain provisions discriminating against whisky.

They take the full credit of having obtained that legislation. Then this follows:

Is not \$50 a small fee for results obtained by you, by all? Out of the 2,500 bona fide wholesalers throughout the country, 600 belong to the N. W. L. D. Association. This means that about 25 per cent of the trade bear the entire burden of furnishing protection to the liquor industry, and 75 per cent enjoy the benefits of organization without participating in the expense.

Doctor WILEY. I read from this of the 29th of January, 1905:

The pending pure-food bill is so worded as not to touch bottled-in-bond whisky—

Now, listen to that. Where is there anything that suggests any such thing—

or to require any label upon such bottles warning the public of its dangerous character—

there you have it, there—

and the large percentage of fusel oil which it contains. The bill, however, has a provision which is aimed at blended whiskies.

Who aimed it? When that bill was formulated nobody had ever discussed blended whiskies, so far as I know. That provision has been in there ever since Senator Paddock put it in. I have been accused of being the author of that bill; I have never had anything to do with it, only as I have been called upon by the committees of Congress and people through the country for my opinions. I never wrote a word of it. I am not responsible for that bill, and I think it would have been a great deal better bill if I had been.

This is the organization that comes to you to-day and asks you to eviscerate this bill and take out of it everything that is in it for the protection of the health of the American people, because, forsooth, one Doctor Wiley is utterly arbitrary and entirely unmanageable and passes all bounds, and tells lies which even Ananias would have blushed to utter.

ADDITIONAL STATEMENT OF MR. WARWICK M. HOUGH, OF ST. LOUIS, MO.

Mr. HOUGH. Mr. Chairman, I will not take the time to read all of this. I will only say that an effort has been made to make it appear as though everything that was done by the whisky men of the country was done to defeat pure-food legislation, and everything that was being sent out for the purpose of propagating light on pure-food legislation—that everything I say that has been done in that direction has been done by the whisky men also. There are a number of large interests in the United States who are opposed to the pure-food bill in its entirety. The whisky interests have never taken that position.

If you will investigate the report of the hearings before the manufacturers' committee, and I would like to be permitted to file a copy of that with the committee if this is material, you will find that we have stated that the only thing we would ask for in the bill is that it be so amended by striking out the word "added" as to make it apply to straight whisky, and that only the word "blended" should be required on blended whisky.

Doctor Wiley wants to make it appear that everything is done by design; that because some advertisement appeared in Boston when he was there, therefore that had something to do with the meeting of the pure food standard committee there. That is not true.

As a result of the opposition to certain provisions in the pure-food bill, all the different pure-food interests of the country communicated with us and wanted us to act with them, and explained a great many of their plans, and what they were going to do, and I had ample opportunities to accept retainers, all of which I have declined, and I only represent the whisky men, in order not to be mixed up with these other matters. All these things done by the different food interests Doctor Wiley would like to have you understand are being done by the whisky men. That is not the truth. Everything done by the whisky men, my clients, the whisky men are perfectly willing for me to disclose. I prepared this statement, extracting these statements from works—authorities—published books on the subject of whisky, to show that Doctor Wiley's statements on the subject were erroneous.

Doctor WILEY. Why did you quote me in these advertisements?

Mr. HOUGH. Because you said before the manufacturers' committee that in order to make that thing fit to drink the fusel oil must be removed.

Doctor WILEY. Yes; I thought so then.

Mr. HOUGH. And you said it then.

Doctor WILEY. I did.

Mr. HOUGH. Then you are not misrepresented, and you are right now, or at least you are more nearly right now, when you say that fusel oil does not oxidize, because it is therefore admittedly an impurity.

Doctor WILEY. Will you make that correction in the advertisement?

Mr. HOUGH. Do that at your own expense, Doctor. It states what you did say. I am not putting it in the paper, and I am not controlling it. I furnished that to the committee having that in charge and they put it in. The fact is that there is nothing in those advertisements but quotations, and it is all in quotation marks, and it is all put there for the purpose of letting the public know the truth about whisky, and it takes a long time to overcome the false ideas which are attributable to Doctor Wiley and his utterances.

I think Doctor Wiley has come to this latest conclusion of his because he got that from Doctor Schidrowitz, who is a noted chemist, who accompanied Doctor Wiley all over England and Scotland. Every chemist in the country has said that Doctor Wiley is wrong about the whisky question, and I could convince this committee if I had the time and the committee wanted to listen to it, that Doctor Wiley is wrong on that question, as I expect to convince the Interstate Commerce Committee of the House next week. I know something about those questions he has referred to. But we have nothing to do with that.

I have declined to appear as attorney for any other interest but the whisky interest in these particular matters. There are 40 large interests in the United States who say that Doctor Wiley's standards would be absolutely injurious to their business, and if I wanted to tumble into this committee all the literature which I have bearing on the subject of Doctor Wiley's administration of the office, it would make a volume that you would never be able to read through. I have cut all those things out, so far as it was possible for me to do so, and present the proposition from the standpoint of the only clients that I represent.

As to the so-called "honey lie," a copy of which I have, I do not suppose the gentlemen suppose I sent to them a copy of the circular which is being used by those who are trying to support the passage of the pure-food bill to create the impression that the whisky people raised a fund to bribe Congress. Somebody else is sending that out. Who is paying for all the advertising matter that goes out on that line?

The membership fee of the association I represent is \$50 a year, and they have 600 members. How much money does that raise; how much toward the \$250,000 that Doctor Wiley has intimated to other people has been raised for the purpose of defeating pure-food legislation? There is not a word of truth in it.

Doctor WILEY. To whom did I intimate that?

Mr. HOUGH. To one of the newspaper men, who told me—

Doctor WILEY. What is his name?

Mr. HOUGH. Smith is the man.

Doctor WILEY. Oh, I know Smith. You employed him yourself. He is the man who published that fake interview with me last winter.

Mr. HOUGH. I employed him.

Doctor WILEY. I can tell you all about that matter.

Mr. HOUGH. Doctor Wiley was not misrepresented in the matter, but he was forced to come out and tell the truth, a thing which he had refused to do before.

Now, Doctor Wiley had stated—he said he did not state it, afterwards—that 85 per cent of the whisky of the country was impure and adulterated. I saw Doctor Wiley and I said “That is not a true statement.” He said “I did not say that. I said that 85 per cent of the whisky of the country was a blend or a compound, and that if it was sold as straight whisky it was impure or adulterated, or misleading.” I said “That is a correct statement, because I think that even more than 85 per cent is a blend or a compound.” “Now,” I said again, “why do you sit here and let a certain interest use a statement, which you say you did not make, to advertise bottled-in-bond whisky and try to discredit blends, on the theory that blended whisky is not pure whisky, when it is the only original whisky?” I asked him why he did not correct that statement. He said he thought he might do it. He did not do it. I wrote him numerous letters and that correspondence was published by the association, and I have copies of it here to-day. That correspondence was undertaking to tell Doctor Wiley what were the facts on the whisky subject.

I was in the Willard Hotel one evening, and I was telling some newspaper men about the difficulty that I was having with Doctor Wiley; that he admitted that a certain statement had not been made by him, and yet he would not correct a misquotation which was being used by the bottled-in-bond whisky people; and one of these men said “I will get out the facts before the public if you will permit me to do so.” He said “I attend all these meetings and hearings and committee meetings of Congress and report them and send them broadcast over the country.” I said “I will be very glad to get the fact before the country that 85 per cent is not impure, spurious, adulterated whisky; that the statement that 85 per cent is blended or compounded whisky is a totally different statement.” I never saw the article that he published in the paper until after it was published. Doctor Wiley refers to that as a “fake interview,” but I was informed by him that he did interview Doctor Wiley, and he sent me—which I never published—a written statement of what Doctor Wiley had said.

When that was printed, different newspapers put different headlines upon it, and some of them put in the headlines that Doctor Wiley had denied his original statement, whereas the fact was that Doctor Wiley did not deny his original statement, and nobody had said that he had denied his original statement; but it stated that Doctor Wiley had not made the statement as it was attributed to him. And Doctor Wiley came out over his own signature and said, “the original statement I made was this, ‘That 85 per cent of the whisky of the country was a blend or a compound, and if sold as straight whisky was impure or adulterated,’” thus confirming the statement in the article instead of denying it.

I know nothing about the fake interview. Doctor Wiley wrote around the country that I was responsible for the fake interview, and I wrote him and told him the same facts, and still he did not have the candor to come out and state that the facts were as I have stated them to-day. Why not? Because he did not want to lose the force of the argument that he was using, that it was the whisky men who were trying to defeat the pure-food bill, when he knew that we never objected to any part of the pure-food bill except the addition of the word "added." We say whisky should not be sold if it contains any poisonous or deleterious ingredients.

The impurities contained in the bottled-in-bond whisky, if it does contain them, are many times more deleterious to the health than any ingredients anybody can add to the whisky in equal proportions. Now, so much for that story. I did employ that man, and I was glad to have the facts placed before the country, and I was entitled to have the facts, a thing that Doctor Wiley did not want to have get out. And I and my clients intended to continue to educate the people. And the different chemists in the country who are investigating this matter have concluded, and their opinion shows, that Doctor Wiley is wrong on the whisky question. So much for that. I have simply gone over these matters because Doctor Wiley has put in so many things to reflect by innuendo on this question.

A year ago, as I said this morning, when I was consulted by the importers, it was too late to say anything to the committee because the committee had reported, and it went over until this time; and this might have occurred just as well a month hence as at this particular juncture. So there is no special significance in the conjunction.

I should like to file and have made a part of the record the paper of Doctor Eaton, wherein he points out the defects in the standards adopted by this committee.

Doctor Wiley says that Doctor Eaton is going to lose his job because he is interfering with the pure-food legislation. I want the committee to know the facts about that, because I was informed, and I may not know all the facts; it is on information. Mr. Lorimer in this bill, called a pure-food bill, incorporated the idea that instead of the establishment of definitions and standards by Congress, Congress should adopt the definitions and standards of the respective States, thus leaving the people of each State to determine for themselves what is adulterated or misbranded, instead of having forced on them a standard and a definition which might be adopted by any other State or by Doctor Wiley.

That is Doctor Eaton's only offense. But a bureau maintained here in Washington, and I hope it is not charged that the whisky men support that bureau, for it spends more than the whisky men receive—more than their association receives—in dues from membership, started a fight between the food commissioner of Illinois and Doctor Eaton, because Doctor Eaton and the food commissioner of Illinois dared to say that the Pure Food bill, which has been said to be the Wiley bill, is not the proper kind of national legislation, and articles have appeared in the Chicago Tribune—some of which appear like paid articles—a single one of which would have cost a thousand dollars. Now, who is paying all the money to pass a pure-food bill? Is it the whisky man? Is he doing it? Doctor Wiley would like to have you understand that the whisky man is responsible for everything.

The fact remains that certain matter appears there that bears certain earmarks. I will not say what has been said publicly in Chicago, or what will appear in the papers of Chicago in the future, but why should Doctor Wiley say with so much gratification that Doctor Eaton will lose his job because he said that Mr. Lorimer's bill gives the only correct idea of what should be accepted as standards by the food commissioners?

And yet the people who are in favor of Federal standards, and what is known as the Wiley bill, are not only spending large sums of money—I do not say who they are, and I do not care who they are, but it is somebody who wants to pass that bill—but are spending a hundred dollars for every one dollar that is spent against it. This is not spent to bribe anybody, but to get things in the papers and create sentiment in certain directions, and I have here, if the committee would like to see them, every one of those articles.

The CHAIRMAN. It is unnecessary to read them, I think.

Mr. HOUGH. We will now come to the standards committee. It was an accident, my appearing before the committee in Boston. I have requests on record to be notified of every meeting of the committee, because the association which I represent has gone to very great expense in making examinations and unearthing the correct information as to what is whisky, and employing a great number of chemists in this country in that work in order to be absolutely correct, and I wanted to appear before the committee whenever a question of distilled spirits arose.

We objected to the standards which Doctor Wiley was trying to have established and what he was trying to have established as the tentative definitions. He has no right to establish definitions under this law, but he has gone ahead and established definitions. They took up that subject without any notice to me, and I was there on a totally different matter, and I met a friend of mine, and he said to me "You are fortunate in being here, because the standards committee is going to take up the question of distilled spirits." A chemist was there to give the definition of rum, which by analogy was thought to support Dr. Wiley's theory that would make nothing whisky but what is in that bottle there [indicating], a thing that never was entitled to the name until the last forty years out of the seven hundred years in which whisky has been known as a beverage.

I wanted to ask this chemist some questions to bring out certain facts, because necessarily I have learned something about the chemistry of whisky that had not been brought out by anybody. I asked him a number of questions, such as, "Have you made this experiment and that experiment?" To every question he answered "No," and everyone of these things was material to the statement he was making—that is, to the correctness of the statement he was making. Doctor Wiley, seeing that the chemist was not assented, objected to my asking any questions at all, and I said to him they were having a meeting solely for the purpose of getting information to support some particular theory of their own, and would so state, I would not ask any questions; but if they were trying to get at all the facts, I submitted that the questions which I was asking were proper questions. Doctor Wiley still insisted, and then I said "If you do not want all the facts, and only want the facts that will support a particular theory, very well."

Now, that goes to the question of the way in which the Secretary of Agriculture is supposed to be consulting other food chemists. As a matter of fact, the Secretary of Agriculture has never, so far as I have been able to learn, consulted any other food expert in the United States. This committee, composed of estimable gentlemen, who, as I am informed, pay little attention to the matter except when they are meeting, simply take what Doctor Wiley gives them. Doctor Wiley gets all the data before them, and it is very much like Carleton's story of the school meeting in the New England States; when the elder says something, the others bow their heads and say, "Them's our sentiments, tew."

I object to statements and conclusions based on part of the facts and not on all of the facts. We have been charged with objecting to the correct labeling of whisky. There is not a word of truth in that. I still say that the power conferred upon the Bureau of Chemistry is too broad, in its present unlimited form, and I do not say it merely because I represent the whisky interests. The attempt was made to scare the whisky man away from objecting to the provisions of the pure-food bill, because of the cry of whisky. That started from the same Bureau, right here in Washington, and went all around the country, and at a time when they did not believe the rectifier had killed the pure-food bill, and did not believe that the pure-food bill had been killed, yet they were stating in big headlines, "The rectifier has killed the pure-food bill." That was for the purpose of trying to run into the brush the whisky men for fear the cry of whisky would alarm someone. That is a story I will not tell now, but which I will tell later, all of which led to further correspondence between Doctor Wiley and other parties; all of which throws light on the subject. And it was because the whisky man was the only one out of all the food interests in the United States that dared to come out in the open and state his position and fight openly that the entire efforts of the proponents of the bill have been directed against him.

Mr. ADAMS. Do I understand you to request of this committee that we cut out that portion of the bill which provides for food standards for the Federal Government?

Mr. HOUGH. To take away the authority to establish standards. That was the chief objection in the Senate to a pure-food bill.

Mr. ADAMS. Of course we all understand that this has not the authority of law, that it is an advisory function.

Mr. HOUGH. It is a very persuasive function.

Mr. ADAMS. That is what I want to know, whether you would like to have that portion of it stricken out of the bill.

Mr. HOUGH. I do not think they should have the right to establish standards. I do not think Congress has a right to establish standards.

The CHAIRMAN. We do not establish them; we simply suggest.

Mr. HOUGH. If what are suggested are wrong, why should they be even suggested?

The CHAIRMAN. They may do what they please with them in every State.

Mr. HAUGEN. I think we all agree that some whisky that is being sold is adulterated. What would you suggest to prevent that?

Mr. HOUGH. Let the bill provide that no whisky shall be sold that contains any adulterative or poisonous substance, whether added or

otherwise. Is not that fair? And if you want to distinguish between the two, provide that on every bottle that does not contain straight whisky there shall be the words "blended, rectified, or vatted." Those are the three words necessary.

Mr. ADAMS. What is straight whisky?

Mr. HOUGH. It is a hybrid, because there was no such thing known as straight whisky prior to 40 years ago. Now, I will tell you what straight whisky is.

Mr. ADAMS. What is the so-called straight whisky? What is pure whisky?

Mr. HOUGH. There is a difference between "pure" and "straight."

Mr. ADAMS. Call it "pure," then.

Mr. HOUGH. Pure whisky is a whisky which is free from impurities, without reference to the process by which it is produced. Whisky is a manufactured product. The impurities in the whiskies that come over from the still are called fusel oils.

Mr. ADAMS. Is there any such thing as pure whisky on the market?

Mr. HOUGH. Yes; I have a whisky which is a straight whisky which can be bottled in bond, because it is not eight years old, and contains no fusel oil, and a finer flavor you never—smelt.

Mr. HASKINS. Is that whisky when it drops from the still pure whisky?

Mr. HOUGH. No, sir; and "whisky" was never applied to that spirit as it dropped from the still in the old days.

Mr. HASKINS. Where is the adulteration there?

Mr. HOUGH. In making the whisky you take the grain and grind it up like you were making a mush, and you put it in a big mashing tub and subject it to heat and a little diastase, which is something found in malted barley, and has the effect of converting the starch of the grain into sugar. The carbonic-acid gas is then thrown off. I am leaving out details in this description, you understand, in order to be brief. It is then put into the fermenting tub and mixed with the yeast.

When the yeast is put in it the fermentation produces something in addition to the ethyl alcohol which is read about. The amount of the higher alcohols that are produced, as well as of the lower alcohols, depends on the care exercised in watching the fermentation and also the purity of the yeast, and they take great pains to introduce a pure-culture yeast. The distiller who knows his business will get up at 3 o'clock in the morning to stop the fermentation when it has gone far enough. The distiller who does not care, who would rather sleep, will roll over and say "Oh, well, it will come out somehow, and we can still put it in bond and sell it under the 'bottled-in-bond' stamp, and claim that the Government guarantees it to be pure."

Now, even though these impurities have gotten in there as the result of fermentation, as the result of the carelessness of the distiller, they can still get them out when you come to redistill it, because that is simply a separation of the volatile matters in the mush. The volatile matters rise up like the steam out of the spout of a teakettle and come out in the worm, and that has cold water applied on it and it condenses into a liquid. Then when they come to redistill it they can divide it up into foreshots, feints, ethyl alcohol—and in different countries they have different names for it.

When you come to the redistillation, which is rectification to the extent of partial purification, you have all the products of the still, except those that are not fit to drink, and which is never consumed except when it is turned out of a moonshine still, and then it is called "moonshine whisky." That is high-grade oxide of ethyl under the internal-revenue laws, or ethyl alcohol, and it is ethyl alcohol which is the body of whisky.

Now, if it is low in proof, which means that the percentage of water is greater than the percentage of alcohol, it is called "low wines." If it is high in proof, which means that the percentage of alcohol is greater than that of water, it is called "high wines." But it is otherwise known as "spirit of wines," and sometimes "wines."

First, I will say of the redistillation that each one of these substances has a different boiling point, and that enables the distiller to separate the bad from the good. What he wants is the ethyl alcohol and water plus a few of the flavoring ethers which are not classified as fusel oil; and on the point of this amendment I can say something, because I talked with Doctor Schidrowitz, who, I think, gave Doctor Wiley the idea about that fusel oil not oxidizing at all. I was in Europe, as I said, all last summer investigating this subject myself. Now, this is from a report of the Commissioner of Internal Revenue, and this statement is a quotation in that report: "The amount of the impurities in the whisky depends upon the care which the distiller exercises in stopping the distillation when the vapor temperature rises above the boiling point of ethyl alcohol and certain flavoring matters."

Fusel oil has a high boiling point—270 degrees, I think—very much higher than the ethyl alcohol or water or these other ethers. Now, that is the fact. Whenever the whisky contains a large amount of fusel oil it is because the distiller wanted to get the largest possible yield from a bushel of grain. He can shut that off if he does not want to get the largest possible yield from a bushel of grain. Consequently, I say that the whisky should be judged by what it is, and not by where it is made, or because it is straight whisky; and if that fusel oil is in there it is just as bad as if an equal amount of strychnine had been added afterwards.

Consequently, out of the bill should be first stricken the word "added," since fusel oil serves no useful purpose in the whisky. The theory of the distiller has been that it did serve a useful purpose. So that Doctor Wiley's new theory is against his own position. If this is true in its entirety it is an additional reason why that whisky which contains it should not be regarded as pure whisky.

That whisky which is drawn from the receiving cistern and put in bond gets something which comes from the addition of charcoal. At the present time they add water to it to make it equal parts of water and alcohol, and then it is called "proof spirits."

In 1867 it was stated in the United States court—and I have stated that in an advertisement, and I am sorry Doctor Wiley objects to it, but the citation is given in the advertisement and it is quoted—that it was the process to which that article was subsequently subjected by the rectifier which produced whisky; and yet Doctor Wiley would have you and the public and everybody else understand that the process to which the rectifier subjects it produces an impure and spurious whisky. He was never further wrong in his life.

Now, I will tell you how the change came about. The distiller sold the product as "high wines" to the rectifier. He carried it over to the rectifying establishment, because in the early history of this country there were only small stills throughout the land, and the stillers were for the most part farmers. The agent of the rectifiers went around and bought this spirit or high wines, and he shipped it to the rectifying establishment, and then ran it through a rectifying still, which took out every particle of the fusel oil which it was possible to take out by that process. The fusel oil was oxidized separately. But fusel oil, oxidized or unoxidized, and the ethers which come over by distillation, have never since the year 1200 alone produced the flavor of whisky.

The flavor which any whisky has to-day, whether a straight or a blended whisky, has always been created by some extraneous matter. In England they never charred barrels, and do not to-day. Whisky was flavored by putting it in a rum or sherry cask, and when they could not get that they added coloring or flavoring. So that coloring and flavoring has always been added to the whisky. And blending means not only a mixture of the two things which he calls whisky, but it means the mixture of any two spirits, plus coloring and flavoring. And that is what it has been in every age of the world.

And yet Doctor Wiley wants to outlaw that in the interests of that which is most impure and unwholesome, if it contains the fusel oil. It is possible for that not to contain the fusel oil. There is some that does not. But the mere fact that it is that does not make it pure. It is straight whisky with all its purities and impurities, whatever they may be, but it is not touched by the provisions of the pure-food bill. This is getting out the facts about whisky which the blender—and that is the only advertising he is doing—proposes to get before the public in the quickest possible time, because they do not want these misconceptions which have been started by Doctor Wiley to become crystalized into law; and they are doing a meritorious thing, both in the interest of the facts and in the interests of the drinker.

In 1869 Doctor Morse wrote an article for the Popular Science Monthly, and they say that he was a fine physician. Doctor Morse stated that the effect of fusel oil was radically different upon the human system from that of ethyl alcohol. He said that the fusel oil is composed of amyl, butyl, and propyl alcohol, and that both Pasteur and Dujardin-Beaumetz, scientists of renown, have said of the action of fusel oil that it attacks the brain and the vasomotor nerves, whereas ethyl alcohol only produces a sort of anesthetic effect, without leaving any after effects; and this Dr. Willard Morse stated that if you should feed two animals continuously, one on whisky which contained fusel oil and the other on whisky which did not contain fusel oil, both would be intoxicated when they took it to excess, but the brain of the one who took it with the fusel oil in it would be destroyed, whereas the other, although thrown into a stupor just as frequently as the other, would not show any effect on the brain whatever. And he said, consequently, that every encouragement should be given to those who prepare the ethylic beverage, and let the manufacture of that which contains fusel oil be discouraged.

Mr. Cocks. Can you take out all the fusel oil?

Mr. HOUGH. They say that no machinery has been devised by which that can be done absolutely. Take out of that bottle there about an ounce of the whole, and you have got left just water and ethyl alcohol. But water and ethyl alcohol are neutral spirits, and yet Doctor Wiley says that if you add neutral spirits to that it is not whisky. That is all whisky ever was, ethyl alcohol and water, plus a flavor. And while in a scientific journal printed in London it was stated that is all it would be, yet Doctor Wiley said, "I hope that the time will never come when any old thing will be called whisky;" when the "any old thing" referred to by Doctor Wiley was the original whisky.

I will not take any more of your time, but will ask to have this incorporated as a part of the proceedings.

ADDITIONAL STATEMENT OF DR. HARVEY W. WILEY, CHIEF OF THE BUREAU OF CHEMISTRY OF THE AGRICULTURAL DEPARTMENT.

Doctor WILEY. May I say a few words, before closing, as to that incident in Boston?

The CHAIRMAN. All right, Doctor.

Doctor WILEY. I do not want this committee to have the view just given of this occurrence at all. The reason that the committee heard a presentation of the question of the rum question in Boston is because one of the largest rum distilleries in the country is situated there, and we were in session in Boston, and we asked the proprietor and his chemist to come before the committee, because it would be more convenient for them to come and make a statement then than it would be at any other time, and they did so, and gave us very valuable information. Mr. Hough was present, and he began to examine the chemist exactly like a cross-examination in a court. We did not employ Mr. Hough as our attorney.

Mr. HOUGH. I want to object to that, Doctor Wiley; I never tried—

The CHAIRMAN. Our time is limited; be as quick as you can, Doctor.

Doctor WILEY. I suggested that Mr. Hough be requested to desist. I said that the chemist had come there at our request to make a statement, and had not come to be annoyed by any such cross-examination as this, which did not amount to anything. We wanted to know how rum was made, and we asked him to tell us how rum was made, and what it was; and because he said that rum was something that Mr. Hough said it is not, he wanted to cross-examine him. We had there the manufacturer and his chemist, and they said what it is, and it is nothing of the kind that Mr. Hough says it is.

Now, my contention is that if all these things are true that Mr. Hough says, whisky should be nothing but ethyl alcohol and water.

Mr. HOUGH. Plus a flavor.

Doctor WILEY. What flavor?

Mr. HOUGH. Plus a flavor that has been recognized as the whisky flavor.

Doctor WILEY. How will you get it?

Mr. HOUGH. Put it in the cask, or add a little sherry, or add some of the products that you have taken away.

Doctor WILEY. Not all of them?

The CHAIRMAN. We must adjourn now, gentlemen.

(Thereupon, at 4.40 o'clock p. m., the committee adjourned until to-morrow, Friday, February 9, 1906, at 10.30 o'clock a. m.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Friday, February 9, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

The CHAIRMAN. We have before us this morning Mr. Mead, in regard to irrigation and drainage investigations. I will ask Mr. Brooks to take charge of this hearing and conduct it as he sees fit. Whom do you want heard first?

Mr. BROOKS. Mr. Chairman, I could not take that responsibility, but I thought possibly the remarks which the various members might have to make might come in a little more logically after Mr. Mead makes his statement for the bureau, and if that meets your approval, I think it would be the more logical way of going about it.

STATEMENT OF MR. ELWOOD MEAD, IN CHARGE OF EXPERIMENTS IN IRRIGATION AND DRAINAGE INVESTIGATIONS OF THE DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. This item is on pages 42 and 43 of the Estimates. The first is rural engineering. You have a new title to it.

Mr. MEAD. Yes, sir; we are improving it.

Mr. BROOKS. This is a more euphonious title, rural engineering. That is, the use of water and drainage.

The CHAIRMAN. How do you want this taken up, in the same way as the other?

Mr. BROOKS. I thought, so far as I am concerned, that Mr. Mead might make the ordinary statement covering the work of his bureau, and then say what he has to say with reference to the matter coming up on the subject of the separate bills. If I might be allowed, I would like to question him.

Mr. MEAD. As I understand, we are here this morning to consider only one phase of the work. I take it from the notice I received that we are to consider certain bills that relate to the irrigation of small tracts of land, and that particular phase of our work is entirely different from the work we are doing in irrigation where large bodies of land are completely irrigated. I should like to have Doctor True here if we discuss all the work done under the item of irrigation and drainage.

The CHAIRMAN. When we have Doctor True here we will have you here with him.

Mr. MEAD. The kind of irrigation which some of these bills defines has its chief importance because of its relation to the settlement of the semiarid regions and the use of the grazing land; that is, irrigation through the utilization of small water supplies on small separated areas of land and in a country that is now largely used as range country.

The climate and certain other conditions of the last three years have made this feature of western development of unusual importance. There is a recurrence of conditions that existed, or which began about the time I went west, in 1882. Beginning with 1883 there were two or three years of more than average rainfall. Settlement had completely occupied eastern Kansas and Nebraska and had reached beyond the border of what had hitherto been regarded as the arid region.

The lands were attractive. They were fertile and easily cultivated, and there was an inducement for people who wanted homes to extend settlement over into the debatable ground of western Kansas and Nebraska by men who expected to farm just as they had been farming in Illinois and Iowa.

That settlement extended on over into Colorado in later years.

Mr. BROOKS. Will you permit an interruption?

Mr. MEAD. Yes, sir.

Mr. BROOKS. I want you to finish first this area to which this matter particularly applies; what States it covers.

Mr. MEAD. The territory we are dealing with extends from the Gulf of Mexico north to the Canada line and includes the territory between an annual rainfall of 20 inches and the Rocky Mountains. It also includes separated and smaller isolated areas on the westward to the coast. In a continuous belt east of the Rocky Mountains there is about 300,000,000 acres of land. The greater part of that is as yet public land and open to settlement under the land laws. There are also considerable areas of unsold land in the railroad land grants, and considerable areas of unsold land belonging to States.

Going back to the conditions of that earlier phase of that settlement, the people who filed on this land and who built the towns in that country believed it could be farmed, because the climate was changing; that the building of railroads was creating electrical currents that were pulling the clouds farther west; that settlement and plowing up the lands was increasing the humidity of the atmosphere, and that in time western Kansas and Nebraska would have the same rainfall as the eastern part of these States.

Those wet years were followed by dry years, and the result was the western part of Kansas and Nebraska were largely depopulated. There were, of course, individual exceptions, but that was the general result. Towns of 2,000 and 3,000 people would only have a small fraction of their population left; some did not have enough people left in them to form a school district. The people had to go on west, to the irrigated districts.

The CHAIRMAN. As a matter of fact, did they go West, or did they come back East?

Mr. MEAD. Both ways. I knew of their going on West from coming in contact with them. The stories of their hardships made me believe that it was a mistake on the part of the Government to open that land to settlement under conditions that made success impossible. There should have been some reliable guide to those people as to what were the limitations on agriculture in that country. The people who took up homesteads after the dry years came realized that their attempt to farm was hopeless. And that led to the mortgaging of those homesteads to eastern investors. It was systematized by large farm mortgage companies, and immense number of mort-

gages of that kind were placed, the parties who made those mortgages never expecting to pay them. They simply divided the calamity with someone else.

The CHAIRMAN. The eastern tenderfoot was taken in.

Mr. MEAD. In both cases; yes. The tenderfoot who took up the homestead and the one who loaned money on it both lost. I heard a story of the outcome of one of those transactions told by a gentleman who had disposed of a mortgage. He went there with a considerable sum of money that he expended in improvements, and bringing the land into condition to cultivate, and when he reached the end of his own resources, he had not lost confidence. He believed that they were simply suffering from a period of drought that would end, and then prosperity would come again, and so he mortgaged his place to an eastern investor.

He did not pay the mortgage, and it was foreclosed and he was sold out. The holder of the mortgage felt aggrieved, and the borrower wrote about it and stated his own condition. He received a reply which stated he did not deserve anything better; that anybody who would go to that country deserved to suffer; that he was only suffering a just retribution for going into a country that was never meant to be occupied. He wrote back that that might be the case, but justice had not been impartially distributed; that if he was to be punished for lack of judgment in settling there, the man who loaned money ought to be punished for lack of judgment in lending money there; that before he borrowed the money he did have the land, whether it was worth anything or not. Now he had neither money nor land; the money lender had all there was.

I am going into the unfortunate early attempt to settle this large territory, not because I do not believe it worthy of settlement and possible of settlement, but to explain what happens under a mistaken method of settlement. The first attempt had some valuable lessons. It showed that the country was not all alike; that while some lands dried up, in other localities one could without irrigation and by ordinary methods of cultivation farm successfully. There is a divide country south of Denver that has been continuously and profitably farmed for many years. That is due to the fact that the elevation produces a local increase in the rainfall. There is also a section of land around the Black Hills in northeastern Wyoming and northwestern Dakota that is being successfully farmed. There are also certain areas in Montana that are being successfully farmed. But there is a large area of country that, in my judgment, can not, without some irrigation, be successfully farmed.

Mr. BROOKS. And these areas where you can successfully farm are in every instance due to some meteorological condition that is peculiar to that particular section?

Mr. MEAD. Yes, sir; due to meteorological conditions or some peculiarity of soil. There are certain localities where the soil is very finely divided and holds moisture in a remarkable way. But in the greater part of the plains country we can not have the right conditions of life unless settlement is accompanied by some form of irrigation, and that is certainly true of all that country with a clay soil.

The greater part of that country to-day is used as grazing land. To use it simply as grazing territory means a very restricted settle-

ment. Very few people can live in it. The question we have to consider is whether or not you can improve upon that. Furthermore, there is a considerable part of the debatable territory that people have again begun to occupy and are trying to farm.

Mr. BROOKS. Will it interrupt you seriously if you should—or do you want to do it later—at this time draw the line between your work and the general reclamation work of the Government in the Department of the Interior?

The CHAIRMAN. He has not gone over the line at all as yet. He has confined himself to this bill so far.

Mr. BROOKS. Very well; go ahead.

Mr. MEAD. We have, as it seems to me, two problems. One is the working out of the kind of agriculture that will provide for permanent prosperous homes in that country and the largest number of them, and the other is the working out of the kind of agriculture that will protect the people already going in there, that will furnish a reliable guide to the people that expect to go in there and the means of improving their condition, and to protect from disaster those who are going there.

The CHAIRMAN. Is not history repeating itself somewhat as to the moisture there? Have not the last two years been comparatively wet there?

Mr. MEAD. The last two years have been wet years.

The CHAIRMAN. And that is what has brought in this little flow of immigration?

Mr. MEAD. Coupled with the fact that the last five or ten years have been very prosperous years and land values have gone up very much in the Mississippi Valley, so that a man who wants a home finds difficulty in purchasing it there. There is a greater pressure to occupy those lands than there has been in the last twelve or fifteen years. The demand for lands is pushing the people out into that country. There has been a wave of immigration into certain sections of it, filling the country up. That has been accompanied by a real improvement in the methods of cultivation and in the introduction of drought-resisting crops, so that there are better prospects of success than there were in the former attempts if these people who are going in there will make use of these improvements in crops and cultivation.

This real improvement in methods of cultivation is, however, being magnified and exaggerated greatly by those who are promoting development, either because they are honestly misled, or because they have some selfish interest in the settlement. The possibilities of the country are being systematically exaggerated to-day in a good many localities. I have with me a clipping received this morning that would indicate that one could grow more wheat on that arid country, without irrigation, than one could grow in eastern Kansas or Nebraska. In fact it makes that claim, that one can grow three times as much wheat as in Iowa or eastern Kansas.

The CHAIRMAN. I suppose that refers to the durum wheat?

Mr. MEAD. They do not say so.

Mr. BROOKS. Is it true that the success of the durum wheat has been largely coincident with the last three years of heavy rainfall?

Mr. MEAD. Yes, sir. Now, these conditions led our office last year to undertake to determine just what were the limitations that ought

to be imposed on settlement there, what were the limitations that nature had placed on settlement, and to work out a system of farming that would make the most of all the agricultural resources of that region so that all could be utilized to make settlement prosperous wherever it was undertaken.

In this we had as a foundation principle that these resources of land and water must be tested, and their value be determined by showing what could be accomplished in growing ordinary farm crops; high-priced crops can not be the standard, because a great deal of the territory is not only remote from markets, but also remote from railroads and transportation is very important. Further, that the best use of the resources of that region will come from the union of agriculture and stock raising—that is, crop growing must be combined with stock raising.

We must first settle the question of whether we can do better with the range country than to leave it to grow native grass. I believe we can. There is another kind of farming that will be more profitable and less subject to vicissitudes, and that is this: To have a farm unit large enough to give the farmer a native grass pasture for his work animals and milch cows in summer. In the wet years, such as we have had in the last few years, large crops can be produced on this part of the farm. In the dry years, if there is a failure there is still the summer pasturage that will grow in wet and dry years.

Taking those two alone they do not create in the semiarid region satisfactory conditions for settlement. It is a country where the sun shines day after day the whole summer through, and it is a country where there is considerable wind. A home in that country needs trees for shade in summer and a wind-break in winter. And something is needed to relieve the depression that comes with the dust and the brown and lifeless look which the whole country has when the hot winds blow. These depressing surroundings can only be relieved by water. There ought to be combined with the grazing land and the land devoted to dry farming enough irrigation to grow trees for a wind-break and shade around farm buildings, to shelter live stock from the winds in the winter and to shade them in the summer.

There ought to be enough irrigation to grow grass and a garden and a few fruit trees. There ought to be enough irrigation to provide winter food for the milch cows and the domestic animals. With that much irrigation a family can live in that country, and live comfortably, even if it does not make a large income. I believe that with a sufficient amount of land for summer pasturage, combined with five or ten acres of irrigated land, a farmer can live as comfortably in Montana, Wyoming, Colorado, or western Texas as the farmer in Illinois, and he can make as much money.

The question is, What are the possibilities of that kind of irrigation, away from perennial streams and surface-water supplies?

Mr. LAMB. That is what we want to get at.

Mr. MEAD. The possible extent of this kind of irrigation depends on whether the amount of water needed can be found distributed over this territory and whether the water can be made available for irrigation at an outlay that will make it profitable for the farmer. There are three ways in which water can be obtained; first, by pumping underground water supplies either by means of windmills,

steam, or gasoline engines. Usually the water supplies to be obtained from the soil are small in amount, and are soon exhausted by large pumping plants. It would seem that the windmill, which is operated cheaply and will lift all the water that will flow into a well, is well adapted to this kind of irrigation. Then there is the small surface reservoir. In much of that country it is possible to impound, somewhere on each section of land, enough storm water to irrigate five or ten acres of it.

Mr. BROOKS. That is true over a large area.

Mr. MEAD. Yes; a very large area. That is peculiarly true of Texas. For two years we have had a man studying conditions in Texas in what was once known as the Staked Plains region, and there hundreds of these small reservoirs can be built. There are few large reservoirs, but reservoirs that would hold water for the irrigation of five to twenty acres of land can be built by the hundred.

Next is the possibility of winter or spring irrigation, by building ditches and turning out water that comes from snows in the winter, or the heavy rain storms of the spring, spreading this over plowed areas, and saturating the subsoil. This saturated subsoil acts like a covered reservoir, into which the crop roots reach for the needed moisture. Either one of these three methods of irrigation, where they can be provided, will furnish a safe basis for settlement.

Our first effort at testing the value of this kind of irrigation and to gather the facts as to the methods to be pursued was to establish an experiment station at Cheyenne.

We took a tract of land considerably above the stream that flows past Cheyenne and sunk wells to the water table in the soil and pumped the water from these wells for the irrigation of five acres. Then to test the value of irrigation alongside the five acres of irrigated crops, some other land will be planted and a trial made of crop growing without irrigation. By comparison the benefits of irrigation in increasing yield and variety of crops will be demonstrated. The most important feature of this work, however, is to work out the cheapest and best way to pump the water and how to apply it to crops to make it render the largest service. We want to find out the obstacles to this kind of irrigation and how to overcome them.

Mr. BROOKS. How irrigated?

Mr. MEAD. By means of windmills.

Mr. BROOKS. You told the committee it was above the stream, and I did not know whether it might not be irrigated from the river.

Mr. MEAD. There are no rivers, and the creek goes dry in summer. The land is 1,000 feet above the nearest river. The only permanent water supply is the soil water.

The CHAIRMAN. Where have you selected that point?

Mr. MEAD. East of Cheyenne, two or three miles. As I say, alongside of the irrigated tract we have land that we plowed and cultivated last season for the purpose of putting it into the best possible condition to test all the possibilities, growing the same crops by what is known as dry farming. What we are doing there is to compare the possibilities of farming without irrigation right alongside of the farming with irrigation.

We are planting trees on the irrigated and unirrigated land to see

whether it is possible to grow trees without irrigation. If they die this year we shall plant them next year, and keep on planting them, and give them every opportunity.

On the other hand, we propose to show the growth under irrigation and to show the yields and profits of irrigation. We are doing this as a demonstration and a comparison at the same time, and to work out for ourselves the right methods of supplying and using water, so as to be able to give reliable instructions to farmers of the problems they will have to contend with, and how to overcome them. These are things that can be only learned by testing.

The CHAIRMAN. Why has not that been done by the Wyoming experiment station? That is of vital interest to Wyoming, and why have they not done it; and why have not any of your stations done it? I think your demonstration is the way to do it.

Mr. MEAD. I think possibly we first thought of it; that is, we were the first to conceive that here was a national problem—the working out for 300,000,000 acres of the land the kind of farming that is necessary to its successful settlement. We just started that last year.

Mr. BROOKS. And is not this also true, that the ideas of these stations are largely colored by their local conditions, and there everything is irrigation from the streams?

The CHAIRMAN. Not necessarily.

Mr. BROOKS. Pretty near.

Mr. MEAD. I think Mr. Brooks's statement is pretty nearly correct.

The CHAIRMAN. They should be broadened out, then.

Mr. MEAD. Now, because we felt that a demonstration in one place would not be a safe guide for the whole arid region, we took up in a very economical way and in a very unsatisfactory way an attempt to test the same thing in Montana and North Dakota by arranging with men who had windmills to do certain work that we directed. Then we furnished them the directions and got reports. But the great objection to that was that without some one to be there to record and study results as the season's work went on, we did not have the facts regarding the difficulties encountered, and the reason for success or failure, which are necessary in preparing directions for beginners in this kind of farming.

Our experience of last year has led us to believe that the best way to obtain the information needed by settlers is to make investigations and tests of the cost and value of irrigation at a limited number of stations so distributed in the arid belt as to make the results apply to its varying conditions. Something ought to be done at the northern border of the semiarid belt, and there ought especially to be something done in Texas.

Before going into the details of what we propose doing let me point out the urgent need of this work in the southern part of the territory. In northern Texas a tract of about 3,000,000 acres of land was given to a syndicate for the building of a capital. Much of this land has been sold and is now occupied by settlers who have only been there a year or two, and those have been very favorable years.

When the difficult years come, it is going to be of the very highest importance that we be able to speak to them in a positive, definite way, and tell them that they can protect themselves by a certain kind

of irrigation; that they can secure water by certain methods, and must use it in ways we describe, and that it will cost approximately so much. We should be able to tell them whether they can afford to pump water 50 or 100 feet. We want to be able to tell them if they can remain in that country, and how to protect themselves against hot winds and dry years by pumping.

Mr. BROOKS. A good deal of that country is underlaid by a sufficient water supply to admit of considerable pumping?

Mr. MEAD. Yes, sir; the general condition that one meets is this: Starting with the foothills the surface streams, when they run out on the plains, have a bed of sand and sink. It is not probable that all the water of any stream there reaches the large streams. Much of the water sinks into the sand, and if it gets away it gets away through percolation or underground channels.

In India irrigation from pumping alone serves for 13,000,000 acres of land; more land than we have under irrigation at present all together.

The CHAIRMAN. With a population of how much to the square mile?

Mr. MEAD. In some places 1,000 and in some places 500.

The CHAIRMAN. A densely populated country?

Mr. MEAD. Yes, sir; and the report of the famine commission states that the people who depend on underground water supply made available by pumping were the least affected by famine, and their report urges the government to take every step possible to encourage that kind of irrigation in India. That commission reports that not 15 per cent of the water supply of India is utilized in irrigation, and they believe there is a very large development possible there.

Irrigation engineers from India have been here during the last two years studying our windmills to determine whether they could be utilized to cheapen pumping for irrigation in that country. At present practically all of the water is lifted by hand or by animals, and with a larger development they want to introduce labor-saving devices for lifting.

Mr. HASKINS. How deep do you have to go to find water?

Mr. MEAD. It lies all the way from 10 feet to 200 feet or deeper. But there are very large areas where you can get water at from 10 to 50 feet; and I think there is no difficulty about the success of a man settling in that country where he can get water within 50 feet. I believe the time is soon coming when we can say it is 100 feet. And there are places in the southern part of this country where they grow

Mr. HASKINS. How deep do they have to go to find water?

The CHAIRMAN. Are you speaking of India now?

Mr. MEAD. No, sir; of this country. Returning now to our investigations, what we ought to do is this: We ought to select places where the conditions for general settlement are promising. There we should arrange for the testing of irrigation by means of windmills, small reservoirs, and winter irrigation. Five or six places should be selected, not more than that. They ought to reach from the northern to the southern boundary of the semiarid belt; and there ought to be combined with the studies of the irrigated territory observations of the use of grazing land and the cultivation of crops without irrigation on a contiguous area for the testing of the comparative results of irrigation and farming without irrigation.

The planning of the works for providing water should be attended to by one of our expert irrigation engineers, who should also lay out the distributing works and direct the manner of applying the water. The land used may be leased from some good farmer or the actual irrigation and cultivation looked after by some good farmer. In that way the Government will not be subjected to any expenses for permanent improvements. It will not have to build houses or farm buildings, or anything of that kind. It simply pays for the carrying out the work. In some instances we might have to purchase a windmill, but we could turn that in to the farmer in part payment for doing the work we required. The irrigation engineer in charge ought to be a man of mechanical capacity and a thoroughly trained scientific man who understands western conditions.

He will not need to give all his time to supervising one or two of these stations. He ought to employ the remainder of his time traveling over the surrounding country to find out the character of the soil; the opportunities to obtain water for limited irrigation, either through pumping, small reservoirs, or winter irrigation.

In that way we will be able in the course of a few years to make an approximate estimate of how far these kinds of limited irrigation may be relied on to extend settlement and to advise people definitely about how they must go about providing this irrigation if they are going to settle it, or where farming promises to be a failure to be able to advise them to keep out of it, that it is nothing but a grazing country.

The CHAIRMAN. Do you think the States ought to do that, or the United States ought to do it?

Mr. MEAD. I think the United States ought to do it. It is dealing with the problem of public lands.

The CHAIRMAN. Why?

Mr. MEAD. Because if any State deals with it, it deals simply with its locality. This investigation ought to include the whole.

The CHAIRMAN. The United States deals simply with the question of locality in the end?

Mr. MEAD. No, sir.

The CHAIRMAN. Your point is to ascertain where people can go and indulge in diversified farming and succeed. Why is it not peculiarly the province of every experiment station to work out those problems? I agree with you that it ought to be done, and the only question is who ought to do it, the United States or the States themselves.

Mr. MEAD. It is very much more the province of the United States Government than the work of the States. You could make the same statement about any of the work that the Department does, that that is something the State ought to do.

The CHAIRMAN. I think this idea of running to "Uncle Sam" for everything is wrong. I think we are slighting the experiment stations. If they are no account let us take back the money we give them and spend it through the Department.

Mr. MEAD. I think the experiment stations are doing good work and all that they can do. But here is a problem that is naturally a problem for the United States Government.

The CHAIRMAN. Each locality will differ from every other locality, and therefore I say it is a State problem.

Mr. MEAD. In every locality it is the determination of what the Government ought to do with its public lands.

Mr. BROOKS. And right there, is not the disposition of the public lands and the increase of the reclamation fund very largely dependent upon some method of making those lands available?

Mr. MEAD. Very largely.

Mr. BROOKS. Therefore, is it not a matter of the United States simply protecting its own title and developing its own property?

Mr. MEAD. Yes, sir.

The CHAIRMAN. These lands are all the same within the State boundaries, and if you make them successful you make your State successful, and bring immigration, and in the end the benefit is to the State.

Mr. MEAD. It is primarily to the Federal Government in the disposal of these lands. Of course the State is a beneficiary.

The CHAIRMAN. If the State shows that these lands can, by diversified farming, be made successful, the people will go there. They will buy from the Government, but the great benefit will be to the States.

Mr. MEAD. But here are the two phases of that which I think ought to be considered, and I think they are more important than a question of benefits. During the years that I saw men having to abandon the accumulations of a lifetime, because they went and took up what the Government disposed of as a homestead that was not a homestead, it seemed to me that the Government in doing that, and making no effort to determine what were the possibilities of that land, was not discharging its duties to the citizens who went there to settle that land. It seemed to me that the men who went there and received from the Government what was alleged to be a homestead had a just grievance against the United States.

The CHAIRMAN. Take, for instance, the sale of the New York custom-house. Would you say that the Government should not sell that property for more than it was worth? Would you say that they should say to a purchaser, "Oh, no; it is not worth \$2,000,000; it is only worth a million and a half, and we would not sell it for more than a million and a half?"

Mr. MEAD. I do not understand that the Government is trying, in disposing of these public lands, to make the best bargains possible, and get all out of them that it can. The theory upon which we have disposed of the public lands is that this is a trust fund, and we are using those for the betterment of our citizens. That is the idea of the homestead. If we were disposing of these lands with the idea of getting as much as possible for them, we would not have had any homestead law.

The CHAIRMAN. Is it a fact that the price is an equal price all over; that where they sell lands it is a general level figure, and they let you go and select your land wherever you please, wherever you wish to buy?

Mr. MEAD. It is a level price under certain conditions. Some of the lands near railroads are sold at higher prices than those farther away.

The CHAIRMAN. But you have a choice of land at certain fixed prices, and can take any that you find of that class?

Mr. MEAD. I do not understand that the Government considers this

an ordinary commercial transaction. It is handling these lands with the idea of making them serve for the creation of homes, and for the betterment of its citizens.

The CHAIRMAN. But your theory if carried out would almost make the Government select the piece of land suitable to that man.

Mr. MEAD. I have not made myself clear about that. All we will do is this. We will test the possibilities of those lands so far as they are fit to make permanent homes. Now, the result of that test will be that we will be able to protect settlers who are going in there and tell them just how to make their improvements in an intelligent and profitable way, and keep them from making mistakes, and in that way we will aid the Government in the disposal of its domain, and in dotting settlements all over a country that is now unoccupied, and will make a permanent occupancy instead of a nomadic-range occupancy, and also protect the man from the East who goes there and does not know the conditions by giving him reliable information about it. So far as the disposal of the land is concerned that is a matter we would not deal with at all.

Mr. COCKS. Would you not think that almost all of those settlers know of the conditions there, and went there knowing that the rainfall was small, and that it was a precarious life, and that they went there warned and advised exactly what the conditions were?

Mr. MEAD. You mean those who have gone there and failed?

Mr. COCKS. Those who have gone there anyhow. It was common talk all over the United States that it would be very hard for a man to make a living in that country under ordinary conditions.

Mr. MEAD. Oh, no.

Mr. COCKS. In all the places where I have ever been that is so.

Mr. DAVIS. Do you not think unless something of this kind is done it will restrict immigration and keep this vast population that is accumulating all the time in the cities and the thickly populated regions where they will be tenants instead of allowing them to become landowners?

Mr. MEAD. I think unless some agent like the Federal Government that is absolutely impartial deals with this question that this is what will happen; that if we should have another wet year you will have that whole country taken up as homesteads, or the larger part of it, and that much so taken up will have to be abandoned.

Mr. DAVIS. The result of which will be to drive those people back to the centers of population instead of making homebuilders of them?

Mr. MEAD. If those people do not go there and become landowners they are bound to become tenants?

Mr. DAVIS. In another region?

Mr. MEAD. That is it.

The CHAIRMAN. Why should that be? Is the land in the East all taken up?

Mr. DAVIS. I want to ask what this immense population is to do which we are getting.

The CHAIRMAN. I do not see any immense population as yet. It will be a good many years before there is much overcrowding in almost all parts of the country. Of course, the whole country will finally become populated just as Europe is. That will be our ending a hundred or two hundred years from now. But the question of

owners or tenantry does not enter into the question. In two hundred years we will probably be as thickly settled as some of the old countries. At present I do not see that we are anywhere near that point. There are millions and millions of acres that a man can take up.

Mr. MEAD. That country has all the conditions for furnishing agreeable and satisfactory and permanent homes, if you go at it in the right way.

The CHAIRMAN. We do not doubt that. I know that myself.

Mr. MEAD. And if you do not give them the right kind of protection you are likely to have a loss that will do nobody any good from mistaken attempts at settlement, an attempt to do something that is impossible to accomplish and will not do anybody any good. Unless you go about this and do it in some such way as these bills propose that is what is going to happen.

The CHAIRMAN. What became of that vast number of people who went out there in 1881? It was in 1881, was it not?

Mr. MEAD. They began in 1883 and 1884.

The CHAIRMAN. Yes; what became of them? Have you any statistics referring to that?

Mr. MEAD. They drifted everywhere; all over the country.

The CHAIRMAN. What was the character of those people, mostly? They were of the bold, adventurous sort, pushing civilization westward, were they not? There is always an element like that, roving and restless; nomadic, almost.

Mr. MEAD. No, sir. There was a class of people who went there to make simply speculative filings and then go on. There is always that element. But there was a large percentage, far more than half of them, who went there and made substantial improvements, and they had good horses and good plows and good wagons. A great many of them were renters from the eastern and middle States who thought they saw a chance to get a farm and become land-owners. That class of people were the people who stayed the longest.

A man who was simply a rover got out earlier; he mortgaged his land and went on. But those who had put their savings in there stayed, and it was the best class of citizens that suffered the worst. They stayed until they were simply starved out, and then many of them came on to the irrigated districts and hired out as day laborers. Some of them in time have recuperated and made a success in the irrigated districts. Most of them had lost all hope.

The CHAIRMAN. I thought that a great percentage of those men who failed drifted into other businesses and became grocers and store-keepers and miners, and all that sort of thing. Did a great percentage of those men fail?

Mr. MEAD. I never kept track of those?

The CHAIRMAN. Do you think most of them failed? We all know that in newly settled countries those people overreach themselves in every line of business, and then they are followed by a more conservative element, and they move on.

Mr. MEAD. That is of course the history of new countries generally, a prosperous country. But here was an attempt to do something that nature had put bounds on.

The CHAIRMAN. You see what I mean. I want to know whether the Government should not look after the bakers and the grocers and

the hardware merchants and all those men that make a failure in this. They go in there without a knowledge of conditions for the same reason that these farmers went into that arid region without a knowledge of conditions.

Mr. BROOKS. It is a fact that the present conditions incidentally arise out of the fact that the people who do not know the facts are being sedulously and constantly misled, and they are going into a country where they know nothing of the conditions, under entirely false ideas.

The CHAIRMAN. How old are these people? Are they of age? Are they men?

Mr. BROOKS. I know that they are coming from a section of country where they know nothing about these conditions.

The CHAIRMAN. I have a little better opinion of the American farmer than you have.

Mr. BROOKS. I do not wish to interrupt too much, but I wish you would just recapitulate the conditions as they actually exist in that semiarid country to-day.

Mr. MEAD. Going back to what the chairman has said, I think there would not be any obligation upon the Government in regard to the people of the towns. That is no business of the Government. But where a farmer under normal conditions would have succeeded, and fails because it is impossible to make a living, that is a different matter. Now, if you will put conditions of settlement on a basis so that the farmer will be given an equal chance with the earlier settler in Indiana and Illinois, the Government will protect every man who ought to be protected from failure, both in business and agriculture.

The CHAIRMAN. Did the Government pay for all this for those fellows that went West and settled up the country in Indiana and Illinois and Ohio?

Mr. MEAD. Certainly they did.

The CHAIRMAN. The Government did?

Mr. MEAD. Yes, sir.

The CHAIRMAN. There was no Agricultural Department then and no irrigation department, and they just made it out of their own muscle and brain.

Mr. MEAD. The Government did it in this way: It gave those settlers in Iowa and Illinois a homestead that he could make a living off of.

The CHAIRMAN. That man had to make his experiments on that soil as well as any other farmer in any other section of the country. The Government did not make his experiments for him, as to whether he could raise cattle and hogs or anything else.

Mr. MEAD. The conditions there were the same as where those men came from.

The CHAIRMAN. He made it through his own mind and muscle—from his own observations.

Mr. MEAD. Yes, sir; but you are dealing with a soil that looks better than the soil of Iowa and a climate that is more agreeable than that of Iowa; a beautiful country, to go and look at it. The settlers are attracted by what they see and misled as to the danger from scanty rainfall.

Mr. HASKINS. Why can not this experimental work you are asking to have done be accomplished under section 6 of the act of June 17, 1902, under which the avails of all the public lands in the United States were set apart as a general reclamation fund to be used?

SEC. 6. That the Secretary of the Interior is hereby authorized and directed to use the reclamation fund for the operation and maintenance of all reservoirs and irrigation works constructed under the provisions of this act.

Why can not that be done under that act and out of this fund?

Mr. MEAD. That brings up a question that has been discussed before by the committee. This work that is being carried on by the drainage and irrigation investigation of the Department of Agriculture deals with the agricultural side of these questions, the working out and furnishing to farmers of advice and direction and how to use water in irrigation.

Those agricultural problems are being worked on in sections of the country where they are building large works under the reclamation act. Under the reclamation act the Interior Department is locating and building works in sections where there is water for irrigating large areas of land. They leave the direction of how to use that water in irrigation to the Agricultural Department. And that, I think, is the proper division.

(Informal discussion followed.)

Mr. HASKINS. Texas is not included in this statute?

Mr. STEPHENS. No, sir. If the chairman will indulge me a moment, I would like to say a word on this. I will say that we have probably more arid land in Texas west of the 100th meridian, and that is supposed to be arid land, than any other State in the Union. We have a level plains country with a watershed going to the Gulf of Mexico. The Staked Plains are partly in Mexico and partly in Texas, and for that reason we have more level land than any of the other States, and there are no mountains to interfere with the flow of the waters, so that we can use it. Below those plains there are an enormous number of small streams running down, underground flowing water, and that has been ascertained by the cattle men who have hundreds of wind-mills over the country for the purpose of watering cattle.

Now, by getting this amount of money we are asking for distributed in that western country we think very much may be accomplished. I suppose there are other States situated like Texas is, which do not get any benefit from that act. We do not get a cent from the reclamation fund, and this is the only way that we can redeem the whole western half of Texas.

The CHAIRMAN. Who found the water for the cattle men?

Mr. STEPHENS. They found it themselves.

The CHAIRMAN. Yes.

Mr. BROOKS. My question had reference only to territories apart and away from the possibilities of operations under the irrigation act. This is away from the hills and mountains, and you can not bring these streams away out on the plains. You have no reservoir sites, and moreover almost every stream that goes out of the Rocky Mountains is already overappropriated. The reservoir sites have to be in the mountains, and the land that is used for them is either in these small intermountain valleys, or the lands in the valleys or the lands in the foothills.

Mr. HASKINS. That may be so, but the act does not say so.

Mr. BROOKS. I am speaking of the conditions.

Mr. MONDELL. The conditions are such that that can not apply to anything except large projects. The conditions of the act relate only to where there is a large water supply.

Mr. BROOKS. This is essentially for a small man's home.

Mr. MEAD. Yes, sir. The construction of works, which is the purpose of the national irrigation act, is not the essential feature of this. This looks to the agricultural use of semiarid public land by means of the water on that land.

The CHAIRMAN. I am not yet convinced that this is not a problem for the States to take up by means of their experiment stations. You admit that each locality will vary from every other locality, or to put it more particularly, that the conditions in each State will vary from the conditions in another State. Now, if you are going to carry out your theory, you would have to make these experiments all over the country. You would have to have a thousand of them, or hundreds of them.

Mr. MEAD. I think I did not make myself clear, so far as differences are concerned. I do not think that we are prepared to say what those differences would be. There is a similarity of conditions. We are dealing with the same general problem. What I said was that we would not feel safe to say that experiments made in one place would apply to all places.

The CHAIRMAN. Is not that a pretty safe thing to assert?

Mr. MEAD. What?

The CHAIRMAN. That experiments made in Wyoming would not apply to Arizona, if you please?

Mr. MEAD. These tests must be distributed. It does not mean you have to have a thousand of them.

The CHAIRMAN. Perhaps a hundred or so of them?

Mr. MEAD. Our idea was to start with about five, and locate those so they will represent fairly well the climatic conditions from Arizona to Montana, and the gradation between. But in addition to the results of experiments which would be published, these stations would serve with the people of that locality as a demonstration of the methods of utilizing small water supplies, and our office as center for the study of the surrounding territory. What we propose to do is, instead of having a large number of stations, to use a few stations as a guide in examining the whole territory, and see how far it coincides with the conditions we have tested.

The CHAIRMAN. The only way of disseminating that knowledge would be by publication. You can not make it an ocular demonstration except to the very immediate surroundings. A man going out there from New York State could not very well pay the cost of the journey to go to that experiment station and look at the experiments that you are making. You would have to convince him through publications, would you not?

Mr. MEAD. Partly through publications. If you could see the demand that we have for publications of that kind at the Department you would think that there would be considerable dissemination by that means. Men who read our publications would, I believe, be led thereby to make a more careful preliminary investigation, and before

making settlement in that country will go to the stations to find out what methods they must adopt and get advice.

The CHAIRMAN. Will it be possible for the poor man whom you are aiding so much to go there to the stations?

Mr. MEAD. A great many poor men do go there now on these home-seeking excursions. It does not cost much to go on those excursions. The railroads of the West make it almost as cheap to go on the home-seeking excursions as to stay at home.

Mr. LEVER. What will it cost to irrigate an acre under your plan?

Mr. MEAD. It is too early to make any statement of that kind as yet.

The CHAIRMAN. That is what you want to demonstrate?

Mr. MEAD. Yes, sir.

The CHAIRMAN. I think the object is a very worthy one. I differ with you as to the means to attain the end.

Mr. MEAD. I think anyone familiar with conditions out there will see that the need is urgent.

The CHAIRMAN. You think we have reached the point where we have got to open that region to settlement? You think we are face to face with the necessity of taking that step?

Mr. MEAD. I think we ought to do it.

Mr. DAVIS. If we want to keep our population from going into Canada.

Mr. MEAD. That is because the Canadian lands are in the rain belt.

Mr. DAVIS. The Eastern States are losing hundreds of thousands of people yearly.

Mr. MEAD. I think we ought to have it.

The CHAIRMAN. What are the experiment stations of these States doing? We are giving them \$40,000 a year—\$25,000 to the college and \$15,000 to the station. What are they doing? They ought to devote themselves, I should think, particularly and exclusively to the irrigation problem, because that is a problem that faces them. That means the settlement or abandonment, almost, of the lands.

Mr. MEAD. I think the experiment stations are making as wise use of their funds in the West as they are in the East. And in the West they have a more difficult situation to confront than in the East, because they are dealing with a good many conditions growing out of climatic conditions. It is a question of stock raising and dairying.

The CHAIRMAN. Yes, we seem to be taking up all those problems in the several States; and we are establishing little experimental gardens, and we have established in the South three or four silos on a man's farm with the idea of experimenting in dairying matters. I do not believe it is right. The experiment stations ought to take care of this, and the States ought to take care of it. There is not a State in the Union that can not afford to do that work.

Mr. STEPHENS. As to the experiment station taking care of the questions you have been mentioning, the experiment station is situated in Texas in Judge Field's district, where the rainfall is sufficient to produce all kinds of crops. It is 200 miles east of the hundredth meridian, and it is 500 miles east of the vast extent of territory where we want to get this done.

The CHAIRMAN. The experiment station should make experiments in any part of the State. They can do it.

Mr. STEPHENS. They have not been doing it in our State.

Mr. FIELD. It occurs to me that Mr. Mead might acquaint us with the conditions of surface draining and population and give us the information, and then we might be better able to consider these questions of policy, whether the Government should undertake this work and whether it should be done by the States or by the United States.

The CHAIRMAN. Mr. Mead has given more thought to this question than anybody else in the United States, and I wanted to get his ideas on the question. He might be looked on as an expert, almost.

Mr. MEAD. Take Wyoming, where we have these experiments going on. It is a State which is as large as all New England with Indiana added, where the transportation facilities are inadequate, and it requires a great deal of money to get around over it, and that State has for that immense territory one experiment station with \$15,000 a year. That is all it has.

The CHAIRMAN. Does not the State give it anything?

Mr. MEAD. It is too poor to give it anything. It has to depend entirely on what it gets from the Government. The State helps to support the agricultural college. It contributes to the educational side of agriculture—to the agricultural college—all that the State can afford to give. The experimental work is carried on with that \$15,000 which the Government gives.

Mr. LEVER. Let me ask you this question, What is the reason for the existence of the Agricultural Department unless it does do this line of work?

Mr. MEAD. The Agricultural Department certainly ought to do the kind of work that deals with the questions that concern a number of States—that deals with questions that involve national policies. Even if the State had the funds, we ought not to intrust a question of this kind to the State if the Government handles the lands. If it should turn the lands over to the States, that would be a different matter.

The CHAIRMAN. The question then is, What are the experimental stations made for, and why does the Government give them \$15,000 a year, except for these purposes? The question applies that way.

Mr. FIELD. Has any investigation been made of the Staked Plains of Texas as to the artesian supply of water?

Mr. MEAD. The studies of the artesian supplies are carried on by the Geological Survey. We have had in that country for the last two years an agent of our Office who has been traveling over that country for a dual purpose—first, to find out about its irrigation possibilities; and, second, to give proper advice to the beginners in irrigation how to go about it. There is a great deal of irrigation being carried out by private enterprise there. So that we sent there an expert irrigator. He has been gathering information about soils, water supplies—not artesian supplies, but supplies that can be pumped—and about the possibilities of establishing storage for water supplies.

Mr. FIELD. Some years ago the Government had an agent there investigating the artesian supplies there.

Mr. MEAD. Yes, sir. I am personally acquainted with that work.

Now, just to give you one illustration of the benefits of this agent's work. This was given to me by Congressman Slayden's secretary, who traveled for a time with our expert. One night they stopped with a gentleman who was cultivating 15 acres of cotton without irri-

gation. The yield was 15 bales. Our expert induced this farmer to put in a pump and provide for irrigation, and the yield this year is 38 bales.

Mr. COCKS. What was the cost of the irrigation?

Mr. MEAD. The cost of the irrigation was probably not over \$2 an acre.

Mr. COCKS. Did he have a flowing well there?

Mr. MEAD. No, sir; he pumped it with a gasoline engine.

Mr. COCKS. How deep did he go for his water there?

Mr. MEAD. I think about 50 feet.

(Adjourned.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Monday, February 11, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

**STATEMENT OF MR. GEORGE WILLIAM HILL, EDITOR AND CHIEF
OF THE DIVISION OF PUBLICATIONS.**

The CHAIRMAN. On page 34 of the book of estimates your items begin. I see there is practically a complete reorganization of your division. You propose to change it into a bureau, and to change all your salaries and effect a general reorganization. Will you kindly tell the committee why this is, and what you hope to do by this change?

Mr. HILL. The bureau organization has become practically necessary simply by the growth of the division. I have it now divided somewhat awkwardly into a division with subsections, and the attempt has been made to give it an organization which is more systematic, more complete, and which will help me very much, I think, in performing the work. The cost of the reorganization has been cut down very low indeed. The reorganization involves only the raising of the three salaries by \$200 a year. If it were to remain in its present condition these salaries really ought to be raised, just the same; but that is the only expense which is involved in the reorganization.

In almost all the bureaus there are editorial clerks, sometimes appropriated for as editors, and it is extremely important that we should impress upon all these gentlemen that we are to continue to have supervision, and in a certain sense the control of the printing work, and that the Division of Publications is a bigger thing than they are. There is a natural tendency, of course, in the different editorial sections of the various bureaus to run things their own way, and it becomes my duty quite frequently in the interests generally of economy to discuss matters with them, and I think you can readily understand, gentlemen, that it is a good deal easier for me to discuss matters with them if they realize that the ultimate decision lies with me than if we discuss things on equal terms.

The CHAIRMAN. How do you expect to effect that point, that your decision will be final?

Mr. HILL. Of course there is always the Secretary as an umpire, but it will save me and him a great deal of trouble.

The CHAIRMAN. You say it will be different if your decision could be made final?

Mr. HILL. It will give it much greater weight, I think, by argument in any discussion affecting the printing, if it is understood that I am the chief of a bureau; that I rank, in other words, with these gentlemen's chiefs, and not with these gentlemen. They are appropriated for as editors, and so am I. They represent a bureau chief. Now, I would like to have the assistance of what little prestige is given by being a bureau chief, myself, the equal of their superior officers, rather than their colleague.

The CHAIRMAN. Do you think, really, you can effect anything by a change of title?

Mr. HILL. I think that that would effect quite a good deal, and I think a good deal would be effected by having a more systematic organization than is possible under a division. It is just about like this: It is the case of a regiment that has got too big for regimental organization, and it has got to be brigaded. I have 155 to 160 people in my division. I am obliged to divide it into sections and give these gentlemen the responsibility which attaches to a chief of a division in the other bureaus.

Mr. LEVER. There is no increase in the salaries, I believe, is there?

Mr. HILL. There is an increase of three salaries. I think they are increases that ought to be made, anyway. They are very modest, and they are gentlemen who have been there a long time.

The CHAIRMAN. That increase is \$6,000?

Mr. HILL. \$6,000 altogether, but that is not involved in the reorganization.

The CHAIRMAN. That is involved in additional help?

Mr. HILL. In a little additional help.

The CHAIRMAN. You increase your chief clerk from \$1,800 to \$2,000. Every bureau chief has done that. It seems to be by a sort of concerted action. What is the reason of that?

Mr. HILL. It is the usual pay of a chief clerk.

The CHAIRMAN. There is a good deal of difference between a little bureau like that of entomology or biology and one of the big bureaus. That seems ridiculous for one of those little bureaus to have as much for its chief clerk as the chief clerk of the Bureau of Animal Industry, for instance, which is spending thousands of dollars a year.

Mr. HILL. That is natural in every business that grows, Mr. Chairman; the more responsibility you give a man and the longer he works for you. The chief clerk I have got has charge of 155 to 160 people. We can not be accused of being small. We have accounts that aggregate \$400,000 a year.

Mr. LEVER. How do you have that?

Mr. HILL. Because I have charge of a printing fund of \$185,000, which is in excess of all the appropriations I get through the kindness of this committee.

Mr. LEVER. What is the salary usually paid to a chief clerk of a bureau of other departments of the Government?

Mr. HILL. I think most of them get \$2,000.

Mr. LAMB. I notice they have all asked for it this time.

The CHAIRMAN. One or two of them get it. The Bureau of Animal Industry and the Weather Bureau and those big bureaus get that.

Mr. LEVERING. I am speaking of the Department of State and the Treasury Department and the Interior Department.

Mr. HILL. I think they generally get that in those Departments.

The CHAIRMAN. There is no use trying to compare salaries. It is utterly impossible to compare salaries in these different departments. You will find messengers and clerks and all that class of employees getting different salaries in all the different departments. They will get one salary at Boston and another at Portsmouth for the same kind of work exactly, and it is very hard to make any comparison at all.

Mr. LEVER. There ought to be some equality here in the city of Washington, where the cost of living is the same.

The CHAIRMAN. There is not; not a bit.

Mr. HILL. I think it should be judged by the responsibility there is upon a man and the efficiency with which he performs his work.

The CHAIRMAN. There is no doubt about that.

Mr. HILL. Just as it is in other kinds of work. I do not think my business should be called a little business. We have 160 people, and our expenditures aggregate \$400,000 a year, to say nothing of the large amount of work that is not represented there at all, but which is done for Congress. Congress decides what we do, and spends \$400,000 a year in printing the publications of our department outside of this entirely, and those publications have to be prepared through my division, and I think Mr. Mudd, the chief clerk, is a very efficient man and an overworked man. He is a man who puts in plenty of extra time, and he has got a great deal of detail to attend to.

The CHAIRMAN. Here is Dr. Wiley, whose chief clerk is a woman, and he thinks that she ought to get \$2,000 a year in the Bureau of Chemistry.

Mr. HILL. I would rather not make any comparison.

The CHAIRMAN. He spoke in the same way of her; he said that she puts in a very great deal of work and extra hours, and that she is a very competent person.

Mr. HILL. She certainly is, and is a very efficient woman; but it seems to me this man should certainly get \$2,000 a year. He has been working as chief of division, practically acting as such for four of five years, and he was with the Division of Statistics before he came to me, and I do not think he has been absent two weeks a year in seven years.

The CHAIRMAN. Do you mean to say that he has not taken any leave of absence?

Mr. HILL. None of my responsible men have had full leave of absence.

The CHAIRMAN. They are entitled to it by law?

Mr. HILL. No, sir; they are entitled to it if the Secretary finds it permissible and possible to give it to them and the work permits.

The CHAIRMAN. Where did that come about? I thought all the Departments had thirty days by law.

Mr. HILL. No, sir. The statute says that the head of the Department may, if the state of the work permits, grant leaves of absence, provided that in no calendar year shall he give more than thirty days.

The CHAIRMAN. Has not that finally been construed to mean that they are entitled to thirty days' leave?

Mr. HILL. It is construed so by a large number of the junior employees, but I never knew it construed so, and effectively carried out, in regard to the more responsible employees.

The CHAIRMAN. I never knew the exact language of the law under which the clerks were entitled to thirty days' leave with pay, but I always supposed that it was mandatory, and that they were entitled to it by law.

Mr. HILL. No, sir; I think the Government Printing Office is the only establishment in which it is mandatory that the head of the department shall allow it. I can speak very freely, from the experience of twenty-six or twenty-seven years of business life before I came into the Department, and I want to say that of my more responsible assistants none of them have had as liberal treatment in the matter of leave as was accorded in the business house that I was connected with for twenty-five years before I came into the Government service.

Mr. LEVER. Do you give your clerks thirty days' sick leave, and do they have that too?

Mr. HILL. If they are sick. That is limited to thirty days. I do not believe that even including the considerable force we have of ladies, who passed no physical examination on entering the service, our sick leaves will average over twelve or fourteen days a year.

Mr. LEVER. Does this sick-leave idea prevail in the big private establishments of the country?

Mr. HILL. Always, sir. I was in a large fire insurance company, and I had a sick leave of forty days, and it never interfered with my pay. Our chief bookkeeper was absent for three months on one occasion, and they sent him his pay every fortnight, with perfect regularity. I think in private establishments they are far more liberal than in Government employ. I am quite satisfied that my chief clerk earns every penny of \$2,000 a year. He has to look after a force of 160 people.

The CHAIRMAN. Coming back to this increase, how do you account for this \$6,000 difference in the statutory roll? Where is it made up? You increase the salary of the chief clerk \$200, for instance.

Mr. HILL. I have organized an indexing division, and that gives a man that was getting \$1,800 as editorial clerk, but whose time has been almost entirely taken up in indexing, an increase of \$200, and instead of being a clerk, makes him chief of the indexing division. Then one index clerk is additional. That makes two increases of \$200 each, and one new employee at \$1,200.

The CHAIRMAN. That makes \$1,600.

Mr. HILL. Yes, sir. Now, there is the chief of the illustration division. There is a gentleman getting \$1,800 a year who has practical charge of that business. And I might say that he was offered in another bureau—another Department of the Government—\$2,400 a year. He feels very much more at home with me—I think he likes me and he likes the work—and I told him I would certainly try to get him \$2,000, and I hoped that he would stay with me; and after some consideration he concluded that he would try it.

The CHAIRMAN. That was in another Department of the Government?

Mr. HILL. Yes, sir; but if I am to lose my efficient people because I can not give them the pay that they ought to have——

The CHAIRMAN. If I could get \$400 in another Department I would certainly take it, in his place. That is \$600 more than you are giving him now. If he stays there at \$1,800, that will be \$600 a year less than he could get in the other place.

Mr. HILL. I will lose him unless I give him an increase in salary.

The CHAIRMAN. Why should he stay there at \$2,000 if he can get \$2,400?

Mr. HILL. He is familiar with our work, and he might run the risk of not filling the bill in the other place.

Mr. HENRY. What office is that?

Mr. HILL. Chief of the illustration bureau. He certainly saves his salary every year, of \$2,000, in the line of economizing in illustration work. There is no change after that. "One draftsman or clerk, two draftsmen or clerks, one at \$1,200," and then the chief clerk.

The CHAIRMAN. That reads "One chief clerk (\$200 additional submitted)." The next is "Four clerks, \$1,000 each (increase of one submitted)."

Mr. HILL. Yes, sir.

The CHAIRMAN. What are you doing; are you promoting all of these lower men?

Mr. HILL. I propose to give that place to a lady who is keeping my books for \$720 a year, and who has passed the examination insisted upon by the President, which makes her eligible for a higher place. She developed into a bookkeeper simply because she was competent and available, but she was in the class of skilled laborers last year. She was covered into the service last year.

Mr. LAMB. What is her name?

Mr. HILL. Clark. She is doing work that we always paid a thousand dollars for. Before she took hold of that work I paid my bookkeeper \$1,000 a year. I was obliged to send him over to assist the chief of the folding room, Mr. Handy, whose work became too onerous for one man, and the only man I could send him was my bookkeeper, and this lady was then an unclassified laborer, but she has a good deal of ability in bookkeeping, and I put her there temporarily to fill the place until I got a bookkeeper. At that time we had a larger lump fund, and I was able to dispose of these matters a little more conveniently; but she filled the bill so acceptably that we have continued to keep her there. But I feel that she has been working now for two years in that position, and I think that it is a shame to keep her there without giving her the salary.

A thousand dollars is the lowest salary paid any of our bookkeepers. You will always find, in making these comparisons—I say it without fear of contradiction—that I come in at the tail end; that I am the most modest man in the lot. I am giving my chiefs of division \$2,000. That is the lowest salary paid to any chief—I mean I am asking that.

The CHAIRMAN. Yes.

Mr. HILL. That is the lowest salary paid to any chief, and \$1,000 for a bookkeeper is the lowest salary paid to any bookkeeper in the Department, or I think in any other Department.

The CHAIRMAN. The next is "One chief of document division, at \$2,000 (in lieu of assistant in charge of document section, at \$1,800)." That is a raise in salary.

Mr. HILL. Yes, sir; that is a raise in salary. That man controls an output of 10,000,000 publications a year. The superintendent of documents at the Government Printing Office gets \$3,000. This man has a very responsible and very onerous position; very onerous duties.

Mr. HENRY. He is a very efficient man?

Mr. HILL. Yes, sir; he is a very efficient man in his place. I regard any man as very efficient who will run a section of over 100 ladies without friction.

The CHAIRMAN. I see you provide for a forewoman.

Mr. HILL. I have a clerk practically doing the work in that place, and I do not want to appropriate for her as a clerk, because while she is eligible as a clerk, it is most likely that if I were to lose her I would have to fill her place with a skilled laborer.

The CHAIRMAN. What is that woman doing now that you propose to promote to a forewoman?

Mr. HILL. She is practically filling that place now.

The CHAIRMAN. At what pay?

Mr. HILL. Twelve hundred dollars, as a clerk. By putting her in as a forewoman it will give me the advantage, in case of necessity, of being able to fill her place from the ranks of the skilled laborers, who are more likely to furnish a substitute than the clerks are, and give me an additional clerical place at \$1,200, which I would like to give my stenographer and typewriter, who has been with me six or seven years, and was, like Miss Clark, at \$720 a year, but who is qualified and eligible to now fill one of these places at \$1,000 a year.

The CHAIRMAN. She is getting \$1,000 now?

Mr. HILL. Yes, sir; she has been for a few months. She was getting \$720.

The CHAIRMAN. How long has she been with you?

Mr. HILL. Six years.

The CHAIRMAN. What did she commence at?

Mr. HILL. Seven hundred and twenty dollars.

Mr. DAVIS. Have you promoted her to \$1,000?

Mr. HILL. A few months ago.

The CHAIRMAN. Now, the next is "One folder at \$900 (submitted.)" That is a new place?

Mr. HILL. Yes, sir; that is an additional folder.

Mr. HENRY. No; you have increased one—\$840. It is a promotion from \$840 to \$1,000. See the next line below.

Mr. HILL. It is not, practically, because I decreased one of these. It practically increases one of them \$60 a year.

The CHAIRMAN. I see you have dropped two folders at \$600.

Mr. HILL. Yes, sir; I have dropped them. You see, Mr. Chairman, last year when the committee crystallized a large portion of my force from the lump fund into statutory places they took them just as they stood on the lump fund, and it gave me an excess of people at \$600. There happened to be a few that were temporarily on the lump fund at \$50 a month, and they were crystallized into the service.

The CHAIRMAN. But will not this make you short of a lower class of laborers, so that next year you will want more of them? You are

cutting out two folders at \$600 a year, which are dropped. Who is to do the work done by those two men?

Mr. HILL. Those will have to be temporarily and occasionally employed. I do not need them permanently.

The CHAIRMAN. They have been on the bill for years and years, and this is the first time we ever knew they were not needed permanently.

Mr. HILL. They were on the lump fund, and when all those who were on the lump fund, including those temporarily employed, were crystallized in that way, it gave me an excess of laborers at \$600 a year.

Mr. HENRY. It was all caused by the blockade you had with the civil service. You were prohibited by the rules of the civil service from promoting certain valuable employees.

The CHAIRMAN. That does not affect this case.

Mr. HILL. In this case I can give it to you in the net roll. We had, for folders at \$600, only two statutory places. We made up the number in the lump-fund provision. Included in that lump fund there were probably 15 or 20 persons employed in the folding room at \$600, including three or four who were temporarily employed. I was not present at all, and had no opportunity to make explanations when the committee simply took all the people who were on my lump-fund list and turned them over to the statutory list, at the same salaries they were getting, including those who were temporarily employed, and I found it rather a nuisance, because when those places were vacant there was no particular object in filling them, and the money went back to the Treasury.

The CHAIRMAN. You practically take one of these \$840 folders and give him a \$900 job?

Mr. HILL. Yes, sir.

The CHAIRMAN. That is the practical effect of it?

Mr. HILL. Yes, sir.

The CHAIRMAN. Now, the next here is "Three clerks at \$900 each (increase of two submitted)."

Mr. HILL. I have only one clerk at \$900 now.

The CHAIRMAN. You want three?

Mr. HILL. Yes, sir; I want three.

The CHAIRMAN. How are you going to arrange that?

Mr. HILL. I have several clerks at \$720 that I would like to give \$840 and \$900. They are people who have come in by being covered into the service as classified laborers. They were made clerks by the appropriation act of last year, and they have complied with the President's requirement that they shall take the clerical examination before they shall be eligible to promotion. They have been doing clerical work. All my force is paid very low indeed, for the reason that a great many people were doing clerical work for me as laborers who simply showed aptitude for clerical work, and we employed them in doing that, and it was more agreeable for them, and it was better to have people who were familiar with their work than to get new clerks. But now that they have passed an examination and become eligible for promotion, they naturally either expect promotion in my own division or they will get it by leaving me and going to some other division.

That will necessitate my calling on the Civil Service Commission to fill their places at \$600 and \$720, and I can not get good clerks, as a rule, from the Civil Service Commission, for \$600 and \$720. I have had three of four refusals from people to accept some of these vacancies that we have had at these salaries. It would be manifestly unjust, if vacancies occur in other bureaus and divisions of the Department under the civil service, to get new people at \$840, \$900, and \$1,000 a year when there are many of our own people who are eligible and who have done the work for years at the lower salaries. At the same time it is going to be hard to fill their places if they leave me. I think in the interest of good management when I can keep good people who are getting in no case more than the lowest salary paid, I should do so.

The CHAIRMAN. The next is, "Seven clerks, at \$840 each (increase of four submitted)." Where do you take those from?

Mr. HILL. From the statutory roll.

The CHAIRMAN. You have certain men and women in your mind in your force, that you are going to promote into those places, I understand.

Mr. HILL. Yes.

The CHAIRMAN. That is a fact?

Mr. HILL. Yes, sir. I have several people who have made themselves eligible by passing the examination, and have been working for me at \$600 and \$700 a year, and I want to give them increased salaries.

The CHAIRMAN. I see that you have directly following this: "Twenty-five clerks at \$720 each (decrease of three submitted)."

Mr. HILL. Yes, sir; a reduction.

The CHAIRMAN. Of three. That means three to go up to the higher grades?

Mr. HILL. Yes, sir.

The CHAIRMAN. That is to offset that decrease of five?

Mr. HILL. Yes, sir.

The CHAIRMAN. Where have those five gone?

Mr. HILL. Three of them have gone to \$720 each. Some of them have gone up. In some cases the money is going back to the Treasury.

The CHAIRMAN. You do not mean to tell me that you are going to let anything go back to the Treasury?

Mr. HILL. Mr. Chairman, I very frequently do. I do it reluctantly, but I do it. It is one of the drawbacks of this statutory roll. Now, I think I can explain to you very briefly, if you will allow me. The statutory roll requires a larger force than the lump-sum force.

The CHAIRMAN. Then the reform that we effected last year did not work advantageously to your division?

Mr. HILL. It certainly did not. Under the lump fund, if anybody was absent without pay or I employed somebody temporarily, for the time when they were not paid the money was available for other purposes. It could be employed indiscriminately for any kind of labor or for material. I could pay labor, or buy envelopes, or buy twine, or buy feed for the horses, and it was available for any purpose. Now, a very large sum was taken out of that fund and applied—crystallized into so many salaries at \$720, \$840, \$900, and \$1,000, and so on—and it has hit us just as we happened to be at that particular time. In a great many cases the only way that I am able to manage now is when

some of these people drop out who are temporarily employed is to see the money go back to the Treasury, or I take somebody by a transfer and twist around and manipulate the thing. My impression is that there has gone back into the Treasury during this past year—or there will go back—\$1,500 or \$1,800; and a good deal more would go back if I was not pretty ingenious.

Mr. HENRY. Would you like to go back to the old lump-sum way?

Mr. HILL. It is far the most economical for the great mass of my people.

Mr. LAMB. I do not see how that could be.

Mr. HILL. The interchangeability of the fund, having one fund that you can spend for any purpose whatever, is a great convenience. You see a great deal of my labor is comparatively cheap labor. Fortunately, some of the better class of labor has been paid very cheap because they have been developed, as I say, from these laborers.

Mr. LAMB. They would rather write than dig.

Mr. HILL. They would rather write than dig. And when they show ability for that we find that the man who combines the practical knowledge of digging with the ability to write is better than a stranger, who can only write.

Mr. LEVER. You get all these people from the civil service?

Mr. HILL. We get them all from the civil service; yes, now.

Mr. LAMB. You can get the laborers?

Mr. HILL. Yes; the laborers also, now. Now there is no use in having any more clerks at \$600. It is the rarest thing in the world that I can fill their places suitably. Owing to the apportionment it is very difficult for me to get people who reside in Washington or Virginia or Maryland. We have to get them from a distance. You take a person who is getting \$40 in Dakota, for instance, or who is getting \$40 or \$50 in Mississippi, and they will not come on here for that pay.

Mr. LAMB. You can always get a plenty of them from Virginia?

Mr. HILL. We can not get them. The apportionment will not let us.

Mr. LAMB. Oh, yes.

Mr. HILL. You can understand that, I think, gentlemen, that it would be foolish; and it is a great mercy that they do not come and flood us with cheap people from a distance, getting \$50 or \$60 a month. Unless a person is going to get something much better, if they are getting \$40 or \$50 at home, they had better stay there than come here for an advance of \$10.

Mr. LEVER. What is the lowest salary paid under the civil-service rules?

Mr. HILL. I really can not tell you; I should say \$20 a month.

The CHAIRMAN. Charwomen come under this, and I think they have lower than that.

Mr. LORIMER. I think that I know some people getting \$8.98 a month.

Mr. LAMB. What do they do?

Mr. LORIMER. Take charge of the post-offices—any janitor service.

Mr. LAMB. Where is that?

Mr. LORIMER. In Chicago.

The CHAIRMAN. Tending fires, and so forth?

Mr. HILL. Yes, sir. They scrub and clean.

Mr. HENRY. How much time do they work?

Mr. LORIMER. They scrub the floors and wash the windows, and do the same janitor service that is performed in any of the large buildings in Chicago.

Mr. LAMB. They only put in two or three hours a day?

Mr. LORIMER. Yes; I suppose so.

Mr. HILL. Our charwomen work three or four hours a day.

The CHAIRMAN. And get how much?

Mr. HILL. Twenty dollars a month.

The CHAIRMAN. The next is "One photographer, at \$1,200 (in lieu of assistant photographer, at \$840)." That is a raise?

Mr. HILL. That is a raise. We employed that man on the lump fund at \$840 a year on trial, with a promise that if he was satisfactory we would give him \$1,200.

The CHAIRMAN. The next is "One assistant photographer (\$60 additional submitted)."

Mr. HILL. Yes, sir.

The CHAIRMAN. That is a new one?

Mr. HILL. Yes, sir; that man is a woman. She is quite competent for that, but I do not think that she is worth more than \$900. The other man is a very skilled photographer—a very competent man. We found him much better than we expected. We drew a prize. But we have found that that was one of the things that the lump fund enabled us to do. We said to this man, "We will give you \$840 to begin with."

Mr. HENRY. How long has he been with you?

Mr. HILL. By the 1st of July he will have been there a little over a year. He is really a prize. There is no photographic work, no matter how exacting, that he is not thoroughly competent to do; and I am sorry to say I find two or three cases where people are nibbling at him and trying to get him away from me.

The CHAIRMAN. There is no place that can not be filled in this world. The next is "10 skilled laborers, at \$620 each (increase of three submitted)." How do you distinguish between a skilled laborer at \$720, and 25 clerks at \$720 each? Here is an increase of three submitted. You decrease 5 above, but you increase them here, apparently.

Mr. HILL. Those were clerks.

The CHAIRMAN. What work have you for the skilled laborers?

Mr. HILL. All the folders are skilled laborers. The driver of my wagon is a skilled laborer. Every man who has some specialty—

The CHAIRMAN. What is there skilled about folding?

Mr. HILL. There is nothing particularly skilled, but that is a classification given in the civil service to distinguish that particular labor from purely manual labor.

The CHAIRMAN. These folders are mostly women?

Mr. HILL. Yes, sir. I should think a little more than half of them are women. Probably the proportion is about as 4 is to 6, 6 women to 4 men. All the heavy work I have to have men to do.

The CHAIRMAN. Why have you increased them three?

Mr. HILL. Simply in the interests of the work.

The CHAIRMAN. You have below here "Twenty skilled laborers, at \$600 each." Several lines above that you have "Thirty clerks,

\$600 each." What are these 20 skilled laborers doing there at \$720 each?

Mr. HILL. There are in the ten skilled laborers a few people who are doing a little better class of work, and look after others who do all my folding work. The clerks do writing and addressing.

The CHAIRMAN. You have 25 clerks at \$720, 30 clerks at \$600, and 35 clerks at \$720 each?

Mr. HILL. Yes, sir; they do a different class of work. The skilled laborers are really laborers. They have to know how to read and write.

The CHAIRMAN. They are folders?

Mr. HILL. Yes, sir; they are mostly folders.

Mr. HASKINS. But you can not change the classification of the civil service. You have to put them in as they are classified to you?

Mr. HILL. Yes, sir.

The CHAIRMAN. They are certified up?

Mr. HILL. Yes, sir, and I can not put a laborer to doing classified work.

Mr. HASKINS. I thought there was a difference between the clerks and the skilled laborers at the same salaries.

Mr. HILL. The duties and classifications are both different. The clerk has to pass a clerical examination and the laborer has to pass a laborer's examination.

Mr. HASKINS. They get the same?

Mr. HILL. Yes, sir. I have a skilled laborer at \$1,000. My chief folder is a skilled laborer and he is not a clerk. A skilled laborer can be appointed to take his place, but I could not appoint a skilled laborer at \$720 to a clerk's place at \$720. I can change clerks for laborers, but I can not seem to change laborers for clerks. There are times when I will take all these clerks at \$720 and \$600 and put them at laborer's work, but I can not put a laborer to do clerical work. In the first place, some of them are not fit for it. A man may be a very good skilled laborer and may not be able to use the pen.

The CHAIRMAN. You drop one skilled laborer at \$480 a year?

Mr. HILL. Yes, sir.

The CHAIRMAN. What is that? Of course, you mean to transfer that man into the class above?

Mr. HILL. We put him up above; yes, sir. Then there is no use of providing for a man at \$480, because I can not get a skilled laborer at \$480.

The CHAIRMAN. Who has been filling this place at \$480 a year? Was it a woman, do you remember?

Mr. HILL. No, sir; I think it was a young man about 19 or 20 years old.

The CHAIRMAN. Was he going to night school?

Mr. HILL. Not a bit of it.

The CHAIRMAN. There is no reason why they should not go to night school?

Mr. HILL. We work them——

The CHAIRMAN. I said going to night school.

Mr. HILL. Oh, night school!

The CHAIRMAN. Yes. Two or three years ago we gave the Secretary authority to employ student assistants, and most of them, while

they were willing to take \$40 or \$50 a month for their work because their work in the Department gave them what you might call a post-graduate course in the lines of study they were pursuing.

Mr. HILL. That was what I thought you asked me about.

The CHAIRMAN. I asked you was he attending night school?

Mr. HILL. I thought you meant that he was attending school, or was—

The CHAIRMAN. No. Is he attending night school and educating himself, and therefore willing to take just what would support him?

Mr. HILL. Yes, sir; I think he came from Tennessee here.

The CHAIRMAN. Understand me, I do not object at all to young men as messengers attending school if they perform their duties to the Government well; they should be allowed to go to these night schools. Undoubtedly you could get young men to act as messengers here to whom you are paying \$480 to \$720 a year—you could get a fine class of young men—who would be glad to come here, with this city's opportunities to attend night school, and act as messengers and in these lower capacities.

Mr. HILL. Yes, sir; there are some young men who have done that. They do not stay there long.

The CHAIRMAN. You have here messengers at \$840 and \$720 and \$600. Why do you make that distinction between them? What is the character of the work performed by that messenger at \$840, and why is he put above the others?

Mr. HILL. Partly because of length of service and partly because of responsibility. He is my own messenger. I was going to say that he is the best messenger in the Department. He is certainly one of the best messengers in the Department, and he is extremely reliable and experienced and quick and alert and trustworthy in every respect.

The CHAIRMAN. Is he white or colored?

Mr. HILL. He is a colored man. He is a very exceptional messenger. Then we have three at \$720 and three at \$600. It is partly a matter of age and length of service. But I want to say that they do not serve simply as messengers. We keep them busy at all times; but they are provided for as messengers, because messenger work is a large portion of their work and I am obliged, until we get into the new building, to employ a rather large force of messengers.

The CHAIRMAN. It strikes me that seven messengers in one division is altogether out of proportion, particularly when you have such an immense number of \$600 clerks and \$720 clerks and skilled laborers, and all that sort of thing, who do not write. I think, for absolute messenger work, that is altogether out of proportion.

Mr. HILL. Almost all my clerks at \$600 and \$720 a year are women, and they are no good as messengers; especially as messengers in my division, because messenger service in my division means going outside. Please understand I have very close relations with every other bureau, and, as you are aware, all our bureaus are scattered immensely at the present time. My own division I have scattered. I have six or seven rooms on the top floor, in the garret. I have one room on the second floor, two rooms on the first floor, and another building over on Thirteenth street, south of B street, a four-story building, and there is a constant interchange going on between ourselves.

If I had no relations with other bureaus there would be considerable messenger service. But my Bureau is one that has close relations with every other bureau and division in the Department. Last year the total number of requests for printing of all kinds and of illustration work that passed through my hands was 5,240, and that means going and coming between all the divisions, carrying things back and forth; and in other words, doing the general business that is done where I have relations with every bureau and division; whereas the other divisions have only occasional relations with some of their colleagues. I have business with every one of them. It takes one of my messengers most of his time going back and forth between my office and the Public Printer. I have a bicycle messenger going two-thirds of the day between my office and the Government Printing Office, and then I have a branch printing office which is in the basement of the building.

Mr. HASKINS. If a Congressman makes requisition on you for a Government publication, whether it is one or more, you have to utilize these messengers?

Mr. HILL. We have to send a laborer with the wagon wherever it goes.

The CHAIRMAN. You have the privilege of mailing them?

Mr. HILL. Yes, sir; we have the privilege of mailing them; but very frequently we get a request by telephone and we send it up by messenger.

The CHAIRMAN. Once in a while, in a debate, a man may want a document immediately.

Mr. HILL. That depends upon whether the gentleman forgets to send for the document until he needs it right away.

The CHAIRMAN. I say in a debate a man may need a document to refer to instantly, and may send for it in that way?

Mr. HILL. Yes, sir.

Mr. LAMB. If every Congressman sent up there as often as I do you would have right smart to do in that line.

Mr. HILL. I think on the average it is no exaggeration to say that we get, during a session, 100 letters a day from Senators and Representatives. Last Monday I handled over 2,000 letters in my division. The mail brought us in over 2,000 letters. I kept track of it for a while once, owing to some of the questions put to me by this committee which I was not able to answer when they were put to me; I kept track of it last year for a while—not this year—and I found that for three months we averaged 1,000 letters a day, and every one of those got a reply of some kind.

The CHAIRMAN. Here is something I did not notice. You have two messengers more. That makes nine messengers. Here are two at \$480 which you want increased to \$540.

Mr. HILL. Nine messengers; but I do not think there is any increase in the number.

The CHAIRMAN. You have increased the salaries of two of them?

Mr. HILL. Increased the salaries of two from \$420 to \$480.

The CHAIRMAN. They are increased to \$540.

Mr. HILL. From \$420 to \$480.

The CHAIRMAN. Two messengers to \$480 each?

Mr. HILL. They are getting now \$420.

The CHAIRMAN. Yes; you are right. That makes nine messengers altogether.

Mr. HILL. Nine messengers altogether.

The CHAIRMAN. Now, you have got a new watchman submitted, at \$720, and another messenger boy down here at \$360. That makes 10 messengers?

Mr. HILL. Yes, sir.

The CHAIRMAN. Do you not think that is a good many messengers for one division? I do not know what work they do. Have you the privilege of employing them as clerks?

Mr. HILL. Yes, sir; I keep them busy all the time.

The CHAIRMAN. If you styled them clerks they would not do messenger work?

Mr. HILL. They would do it more reluctantly. But they are very pleased to do clerical work now. One of my messengers I have to keep on the top floor waiting upon the artists and photographers. These men can not be coming up and down stairs always themselves and interrupting their work, and they have a messenger. At least one-half of the time of that messenger is put in in assisting in the photographic room, assisting in the development of plates. He assists in a great many ways. He is a very good boy and has displayed a good deal of intelligence in that respect.

The CHAIRMAN. Is he the \$360 boy?

Mr. HILL. Yes, sir.

The CHAIRMAN. He is the \$360 boy; and why is he kept ground down to such a low figure?

Mr. HILL. He is the latest comer. I like to keep a place like that so that we can get in a boy on trial.

The CHAIRMAN. What kind of a boy have you now?

Mr. HILL. A boy from the civil service.

The CHAIRMAN. From the civil service?

Mr. HILL. Oh, yes, sir; I have a boy certified who is getting that now.

The CHAIRMAN. What sort of examination did that boy have to pass?

Mr. HILL. He had to write a letter on some topic indicated by the civil-service examiners.

The CHAIRMAN. How old a boy is he?

Mr. HILL. I think he told me he was 17 years old—16 or 17.

The CHAIRMAN. Is he a white boy from the District here?

Mr. HILL. Yes. He is not from the District, but his parents are here. I think his father has a place in the Government service, and he is living with his parents.

The CHAIRMAN. His father has a place in the Government also?

Mr. HILL. Yes, sir.

The CHAIRMAN. Is it not the rule that there shall be no two of the same family in the Government service?

Mr. HILL. I think it is if they are in the same bureau. But it does not debar two of the same family, if they come in in the regular way. I have a son in the Government service myself, who came in from Chicago, under a civil-service examination; very much against his father's will, I may say. He would have done very much better to stay out of it.

The CHAIRMAN. What is that boy doing? Is he studying at night, or anything? Is he improving his opportunity, or is he just going to lose all ambition?

Mr. HILL. I told Mr. Handy the other day—he works with him—Mr. Handy told me he was stimulating him to keep sufficiently posted so that in two years' time he will be able to comply with the requirements that after two years in the classified service he can take an examination for a clerical position. Several of our messengers can take the examination for clerk.

The CHAIRMAN. This boy intends to stay right along in the Government service?

Mr. HILL. I hope not. Some of them do and some of them do not. Some of them are ambitious to get out of the Government service. I always encourage them to do so. It is to their advantage. Some of them show peculiar qualifications like that boy who is in my illustration division. I do not urge him to leave, because I am selfish enough to try to keep him. I think I need not say to you gentlemen what a valuable thing a good, trustworthy, competent young man is in an office. It is a great deal harder for us to get good boys than almost any other class of help. Most of them are shiftless and careless, and when we get a good one we try to keep him. But several of them have left the Government service—speaking of my own division—but some of them have stayed and have developed into very good clerks.

Mr. Handy's first assistant is a young man getting \$1,400 a year, and very much underpaid. He came in at \$720 and passed his examination for clerk and gradually became my bookkeeper. He has got a great deal of experience which is of very considerable value to us, and he is developing Mr. Handy's faculty for getting along with the ladies, which makes him very useful.

The CHAIRMAN. Here is a new watchman at \$720. What is the need of that?

Mr. HILL. We have had two watchmen on account of having a separate building.

The CHAIRMAN. Was not that necessary last year?

Mr. HILL. We filled the place with two of the folders, and I thought it better for this man to be appropriated for under his proper name—one of them.

The CHAIRMAN. Who did that work before?

Mr. HILL. One of the folders; the same man who continues to do it now. It is practically like giving me an additional skilled laborer at \$720.

The CHAIRMAN. You mean it was one of the folders?

Mr. HILL. Yes, sir.

The CHAIRMAN. Detailed to do that work?

Mr. HILL. Yes, sir.

The CHAIRMAN. You had no watchman for that?

Mr. HILL. No, sir.

The CHAIRMAN. And you employed two of these skilled laborers to do that work?

Mr. HILL. Yes, sir; I will continue to employ one of them.

The CHAIRMAN. You have to have two watchmen under the eight-hour law?

Mr. HILL. I can continue to employ one man. He is a very worthy fellow and a responsible man—a thoroughly good man. He is one of my \$840 folders, but he is getting pretty old and is not able to be active enough to do that work, but he makes a very good watchman.

The CHAIRMAN. Is not that watchman at \$720 to take one of those men at \$600?

Mr. HILL. No, sir; he is getting \$720 now; but I raised him.

The CHAIRMAN. That makes another \$600 man to go up in the \$720 class.

Mr. HILL. You will notice that there are ten skilled laborers at \$720; and there is an increase of three submitted.

The CHAIRMAN. Yes.

Mr. HILL. This is practically as if I asked for an increase of four.

The CHAIRMAN. To follow the line opened up by Mr. Haugen's questions, which were not taken down, a few minutes ago, have you any superannuated and incompetent clerks?

Mr. HILL. No, sir.

The CHAIRMAN. Are you suffering from that cause?

Mr. HILL. I can not say that I am suffering. I have as small a proportion—

The CHAIRMAN. What proportion of superannuated men have you, for instance? Take that up first. I do not care whether they are superannuated or incompetent from any cause.

Mr. HILL. I have got an old soldier that I would be glad to get rid of, but I do not expect to.

Mr. HENRY. How long have you wanted to?

Mr. HILL. He works well at times, but on pension days and for a little while afterwards it is pretty tough.

The CHAIRMAN. What work does that man do?

Mr. HILL. He is a folder. The Secretary has reduced his salary twice.

The CHAIRMAN. That does not stop his drinking?

Mr. HILL. No, sir. He takes the pledge several times a year, I think. But this man I speak of who is one of my folders, at \$840 a year, who is doing this duty as watchman, can not be called superannuated. He is very efficient as a watchman. But I have had to take him off of the folder work because he was getting old and rheumatic, and there is a good deal of manual labor connected with the folding, and these heavy books and bags and things of that kind.

Mr. DAVIS. I presume you received a copy of the order, a little while ago, to make out a list of the ages of the clerks in your department, did you not?

Mr. HILL. Yes, sir. I did not have any over the limit.

The CHAIRMAN. What was the limit?

Mr. HILL. The limit was any clerk over 70 years.

Mr. DAVIS. What I wanted to ask was, how do you find out whether they are over the limit or not?

Mr. HILL. I did not ask any of the ladies.

Mr. DAVIS. I was not referring to the ladies. What I wanted to know is this. There are quite a number of clerks in the departments who were covered under the civil-service rule, under what was known as the Cleveland blanket order.

Mr. HILL. There have been several blanket orders.

Mr. DAVIS. What way have you of ascertaining the age of these employees?

Mr. HILL. No way whatever but their statements.

Mr. DAVIS. You know of no instance where they have cut off eight, ten, or fifteen years?

Mr. HILL. There is alleged to be a lady in my division who was 48 years old three years in succession.

Mr. DAVIS. Of course they have to state their age in their applications to get in there.

Mr. HILL. Yes, sir; and they have to state the year they were born.

Mr. DAVIS. I am not referring to the ladies any more than to the gentlemen; but I had it called to my attention several years ago that those who were included in that order, under that blanket order of Cleveland's, were practically immune—that there was no way of ascertaining their ages.

Mr. HILL. It is the same way with every blanket order, I suppose.

Mr. DAVIS. So that, then, if you return to the source from whence that notice came, that would not of itself be very reliable.

Mr. HILL. There was no baptismal certificate of birth or registration that accompanied it.

The CHAIRMAN. So that you have one or two men that you think are not any longer practically fit to discharge their duties?

Mr. HILL. I can not say, except with that one exception of the gentleman of bibulous tendencies, that there is any man who is not competent.

Mr. DAVIS. I had heard, indirectly, that some of the clerks of extended age were making very light of that proposition; that there was no way of ascertaining the ages within a limit of twenty-five or thirty years.

Mr. HILL. I think the record has been well established, and there was no anxiety felt in their lines as to superannuation. Two of these superannuated gentlemen have been in the service twenty to forty years, and the day was when they gave their age without any hesitation.

Mr. DAVIS. Was that made a matter of record at that time?

Mr. HILL. That was made a matter of record always, and I do not see how they could go back on it very well. It would be a very suspicious circumstance.

Mr. HAUGEN. There would naturally be less of this in your Bureau than in the other Bureaus on account of the large increase in recent years in your Bureau?

Mr. HILL. That is possibly so.

Mr. DAVIS. It might be different from the Pension Office or the Interior Department?

Mr. HILL. Yes, sir.

The CHAIRMAN. How many women have you got that you think are not up to their work?

Mr. HILL. Oh, I think possibly there are three or four. I do not think there are more than that.

The CHAIRMAN. What kind of work are they doing, or are they supposed to be doing?

Mr. HILL. Well, they do light folding, a great many of them—that is, on the farmers' bulletins, for instance, where it consists simply in putting up circulars and folding circulars. They do not

handle books—many of them—and sometimes we find a woman who is not fit for one thing who is often fit for something else. I have one lady whose sole business is opening envelopes for the other folders. The envelopes come in boxes, and every box has to be opened and the envelopes must be taken out and opened out. She does that very well. She will open out 60,000 envelopes in a day. Somebody has got to do it.

The CHAIRMAN. How much does she get?

Mr. HILL. Fifty dollars a month.

The CHAIRMAN. How long has she been in the Government service?

Mr. HILL. Longer than I have, I think. I think she has been there ever since I can remember. Now she does that work very well.

The CHAIRMAN. And that work has to be done?

Mr. HILL. Yes, sir; they would otherwise have to do it themselves. If they have some one to do it for them it hastens their work, to have the envelopes all turned right side up.

The CHAIRMAN. Are there any more besides this one?

Mr. HILL. There are some in delicate health, and who have to be considered a good deal, but there are none of them who are absolutely incompetent..

The CHAIRMAN. There are at least 15 or 20 clerks in the Treasury Department, I am told, who, if it was not for the elevators, could not get to their work. That is hard, isn't it?

Mr. HAUGEN. Yes. There has been a statement made on the floor of the House that there was 20 per cent of deadwood throughout the Departments.

Mr. HILL. Then I am extremely fortunate. I have got some people who have to be considered a little, and have to be humored.

The CHAIRMAN. Let me ask you another question, and then really we are through with your Bureau.

On page 36 I see you increase the item for additional assistance, and so forth, from \$3,500 to \$5,000.

Mr. HILL. Yes, sir. I have been run very close with that additional assistance and artists' material, at \$3,500. I do not see how I can get along. I do not say that I am necessarily going to expend it, but I can not run a deficiency.

The CHAIRMAN. It seems to be the impression that we have gone too far with printing of all kinds. The printing as a whole has grown beyond all reason and all need.

Mr. HILL. There is only this to be said as regards the Department of Agriculture. All the rest of the money is spent in acquiring useful information for the benefit of the farmers. Taking it outside of the blanks and blank books and forms, and what you might call administration printing, what is spent for publications is less than \$200,000, and by good management we print an immense amount for the amount of money we spend.

The farmers' bulletins cost a fraction over a cent and a half a piece, and we print over 6,000,000 of those. It takes a great deal of handling, of course; but it seems as if it was a useless thing to spend nearly \$6,000,000 acquiring information, and then to begrudge \$250,000 or \$300,000 to get it out.

The total appropriations for my division, including \$185,000 appropriated by Congress—not by this committee—which is given to the Public Printer for our use, but which I have the administration of

just the same, amount to about \$400,000. That includes all the salaries and all the work and all the distribution and all the editing. The printing, besides, which is ordered by Congress, is a thing that we do not control in any way, and of the total amount, which I think was \$400,000, spent for printing by Congress for its own use, we got about 52,000 copies of all these publications that they printed. That is all the Department got as its share. That is a thing we can not regulate.

Mr. FIELD. There is one thing I want to know. Who is it in your department who passes upon the publications, or the matter that is necessary to assume the form of a publication and be disseminated among the people? Do you pass upon them now? Are you the man that selects them?

Mr. HILL. I pass ultimately in the name of the Secretary. But of course the chiefs of bureaus submit their publications.

Mr. FIELD. Are they ever altered or changed or reduced?

Mr. HILL. There is a great deal of editing and a great deal of reduction. I do not think that I am at all exaggerating, Mr. Chairman, when I say that in the matter of form and the suggestions for economical handling of the work I have saved half of the salaries of my editorial force. I think I save more than half. I am quite sure that is within the mark. You see there are a great many men who are not in the printing business who are not familiar with bookmaking and getting up a thing, and they study solely with the purpose of getting out the information they have got. They do not know a thing about bookmaking and how to arrange tables with economy. That is what the Secretary depends upon me to do, and to bring before these gentlemen the fact that by a little change in this way and that way in the arrangement of these tables, or the substitution of text for tables, a great deal of economy can be effected.

Mr. FIELD. Admitting the force of your argument, it is apparent that it would be of very little use to gather important information unless it assumed the form of a publication and reached the people. But do you not think that a great deal of what is now being published could be eliminated? It seems to me that I see a great deal that is of very little service.

Mr. HILL. In regard to that there is this to be said: If an investigation is conducted and the results are purely negative, the results of the investigation and the manner of investigation have all to be published as a matter of record. We publish now in very small editions. When I first came into my present office our editions ran 10,000 to 15,000 copies. They will now average 3,000 copies. I am not speaking of farmers' bulletins, but it is presumable, and it is the argument that the chiefs of bureaus will submit in favor of this matter that the results, whether negative or positive, must be given out so that they will be of service to a certain class of people. Of course, in those cases they are particularly useful to professional men and students in agricultural science and others who are following the particular line of work that those in that particular bureau are doing.

Mr. FIELD. But of what advantage would it be to me or my constituents to have a great big document dumped out in the room here on soil surveys in Vermont or Massachusetts, to be distributed in Texas?

Mr. HILL. None whatever, in that particular matter.

The CHAIRMAN. The Soil Bureau might say that that enables a man who wants to change his home to Texas, if he lives in Massachusetts, to learn everything about Texas soils.

Mr. FIELD. But there is a good deal of it that is of no use whatever.

The CHAIRMAN. Absolutely.

Mr. HILL. That only applies to that volume of the soil report. I take it that there is no gentleman here, where a soil survey is conducted in his district, who does not want to get the advance sheets of the report.

Mr. LAMB. That is right.

Mr. FIELD. But I would not care much about an investigation on the scale on apple trees in the North.

Mr. LAMB. Yes; you would not want that.

Mr. HILL. There is this to be said on that. I can illustrate that by referring to the sugar-beet bulletin. Outside of the sugar-beet belt there is no use of distributing a sugar-beet bulletin, but when Congress ordered the distribution of the sugar-beet bulletins we did not ask for a particular number for the use of the Senate or the House. We asked for a particular number for the use of the Secretary of Agriculture, and then Congress ordered so many of them for the use of the Senate and so many for the use of the House. That included all the people outside of as well as inside of the sugar-beet belt. That does not detract from the value of that to the people in that belt. It means that a good deal of it was wasted by being sent to people outside of that belt, which was not, of course, in the control of the Secretary at all.

If you were in a place where apples do not grow, bulletins about apples would not interest you, of course. But we only send publications to people who ask for them. What we send them is the list of publications that we issue. We have put a stop to large mailing lists that we used to have years ago. I put a stop to that the first year I was there. We had a large list, known as the Secretary's list, that got everything that was published.

Mr. FIELD. Do you edit all these bulletins that come up?

Mr. HILL. Yes, sir; they all pass through my hands; everyone of them.

Mr. ADAMS. Is there any bill pending in Congress providing for any additional publication of the cattle book?

Mr. HILL. Not to my knowledge.

The CHAIRMAN. I think there was one last year.

Mr. ADAMS. I am being pestered to death with questions as to that book.

Mr. HILL. I think that is due to a little item which went out to the people in the papers not long ago, stating that there were a large number of yearbooks and cattle and horse books in the vaults of the Capitol, and we have received a number of letters stating that it was a very singular thing that we were not able to send them out.

Mr. ADAMS. The demand for the cattle book is very strong.

Mr. HAUGEN. These various publications are edited by the other bureaus?

Mr. HILL. They are prepared at the other bureaus.

Mr. HAUGEN. They have editors, then?

Mr. HILL. Yes, sir; the most of them have what they call an editor.

Mr. HAUGEN. And it is necessary for them to have them?

Mr. HILL. The chief of a bureau where the publications of his bureau become quite too numerous for him to read wants to employ somebody to hold the same relation to himself that I hold to the Secretary. That is, he wants somebody to call his attention to matters which seem to be important enough to require his attention; that is, technical matters or matters of administrative character. Those men can render, and many of them are rendering, to my office a certain amount of service, according to the excellence with which they perform their service.

Mr. HAUGEN. It is quite necessary, is it not?

Mr. HILL. It is quite necessary. But I think it is extremely important, as I said in the beginning, that it should be distinctly understood that the responsible editing is done in the Department by the Department editor. I ventured in this bill to call myself "editor in chief." It does not cost any more money, but it emphasizes the fact that I am in charge—in full control—of the Department work. It will facilitate matters and make it a little plainer to these gentlemen that they are not independent editors—that they are assistant editors. I would not like to put down any man who is being appropriated for as an editor, and insist upon his being called an assistant editor. I would like to emphasize, simply by being called editor in chief, that I am in full charge.

Mr. HAUGEN. That the authority is with you and you have to decide.

Mr. HILL. Yes, sir; I have to decide. I have a corps of five or six assistant editors who are excellent men, excellently well qualified for the purpose, and I am quite sure that these men come quite near saving their entire salaries by the work that they do.

The CHAIRMAN. In printing?

Mr. HILL. Yes, sir.

Mr. HAUGEN. I had reference to the editors outside of your bureau.

Mr. HILL. Yes, sir; I am speaking of my own force. I would like to say just one word more, and that is to assure the committee that if there is one note—one chord—that is struck more frequently in my division than any other it is that of economy, consistent with, of course, judicious and efficient work, and I would like the committee to bear in mind that every addition to the work of the Department is reflected in the addition to my work.

There is no acquisition of information that does not involve the distribution of information; and the proportion between the cost of running my division and the total of the Department, I venture to submit, shows very favorably in the line of an economical management. I can say to-day that we are doing for every dollar we spend twice the work we were doing when we came in there. I can very speedily prove that to any member of this committee, with a little time.

And in the little increases I have asked I would like to call attention to the fact that, after all, they only amount to $3\frac{1}{2}$ per cent increase over last year.

Mr. LAMB. \$7,500, is it not?

Mr. HILL. \$7,500 on a general appropriation of over \$240,000.

(At 1 o'clock p. m., the committee took a recess until 2 o'clock p. m.)

AFTER RECESS.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Monday afternoon, February 12, 1906.

The committee met at 2 o'clock p. m., pursuant to the taking of recess, Hon. James W. Wadsworth in the chair.

The CHAIRMAN. We have before us this afternoon House bill 12612, entitled "A bill to further promote the dairy industries of the United States." This is a bill introduced by Mr. Lever, and we will ask Mr. Lever first to make any statement he desires.

Mr. LEVER. I would like to make an opening statement and file with the committee, so they may go on record, some indorsements I have here in reference to this proposed legislation.

Mr. Chairman and gentlemen of the committee, I recognize the fact that we have authority in the general appropriation bill to do this work as set out in this bill of mine, and my only purpose in introducing it was to call to the attention of the committee the special need for work along this line. It is not necessary, I believe, for me to enter into any lengthy discussion of the matter, and I shall not do so. It is sufficient, I think, to say that the peculiar characteristic of the South, a characteristic inherited, I think, from our slavery system, is the one-crop idea. With us it is the all-cotton system. Ever since I can remember, and long before the civil war, our energies have been devoted chiefly to the raising of cotton. We have not broken away from that habit even now, although in manufacturing we are developing very rapidly. In an agricultural sense, however, we are still absolutely a cotton country.

The Department of Agriculture, through Doctor Spillman's bureau, is endeavoring to teach our farmers the idea of diversification, and this idea is indorsed by the most intelligent of our farmers, and it is in keeping with this idea that this bill of mine has been introduced—the idea of diversified farming. I take it we have the climate, we have the soil, we have the natural advantages in the South for dairy purposes. That we have the markets is a certainty to me also, and that fact will be brought out to you more fully by Doctor Webster, who will touch upon the markets.

I inclosed a copy of this bill to individual dairymen throughout the South, after I introduced it, and I received some replies, and I wish to read you a few of these in order to show you the character of their answers and to show you the necessity for this work, and to show you the interest also of our southern people in this kind of work. I have here a letter from R. D. Dunlap, president of the Consolidated Anthracite Coal Company of Arkansas, who writes me:

CONSOLIDATED ANTHRACITE COAL COMPANY OF ARKANSAS,
Spadra, Ark., January 29, 1906.

MY DEAR SIR AND FRIEND: I notice that you introduced a bill in regard to the promotion of the dairy business in the South, which I wish to congratulate you on and certainly hope that you get it through.

If there is any one thing that is neglected more than the dairy business in the South I fail to know what it is.

Hope that the Members of the House of Representatives may see as you and I do and pass this on the first opportunity.

Let me hear from you occasionally how you are getting along with it.

Yours, truly,

R. D. DUNLAP, *President.*

HON. A. F. LEVER, *Washington, D. C.*

Here is a letter from Athens, Tenn., from Mr. Gettys. He says:

INGLESIDE FARM,
Athens, Tenn., January 27, 1906.

DEAR SIR: I have yours 25th, 1906, and a copy of your bill, H. R. 12612. The dairy industry in the United States, and especially in the South, is in its infancy, and needs all the encouragement and protection Congress can legitimately give it.

The amount seems quite inadequate for the purpose, yet if it could come to the Southern States that were excluded, largely through the Department at Washington, from participation in the great dairy-cow demonstration at St. Louis last year, it would greatly encourage our people. You know the States below the "fever line" were shut out of that national demonstration. Wishing you success, I am,

Very truly,

W. GETTYS.

HON. A. F. LEVER, *Washington, D. C.*

P. S.—My friend, Mr. Henry, of Connecticut, ought to help you in this.

In addition I have another letter here from a dairyman from Hammond, Ga., Mr. W. W. Nott. He says:

HAMMOND, GA., February 7, 1906.

DEAR SIR:

We are a young dairying section destined to be to New Orleans what Orange County is to New York. Our great want is the knowledge of how to decrease the cost of production. Any money spent teaching us the solution of this question will be the most telling move that money can make. Your idea of working with the State experiment stations is good for those of us who read and keep in touch with the progress of the day. Better still is your idea of having an expert come in contact with the individual dairy farmer. The average dairy farmer—with us at least—is reached this way as by no other.

I am fully aware that the more economical production of milk by all will eventually lead to excess of milk production and consequently to the depression of the price of milk. I have 75 producing animals and am laying plans to double this number. But by lessening the cost of production we can meet the cut on price and enter upon butter making and other by-products and be limited in production only by our power to place our article on the world's market.

Hence I say if this money is to be spent teaching us how to produce with economy you can spend it in no better way.

Wishing to cooperate with you, I am,

Yours, with a local point of view,

W. W. NOTT.

HON. A. F. LEVER,

Washington, D. C.

I also have a letter from Mr. George A. Villere, president of the New Orleans Pure Milk Company (Limited). He says:

NEW ORLEANS PURE MILK COMPANY (LIMITED),
New Orleans, February 2, 1906.

DEAR SIR: Your bill (H. R. 12612) to enable the Secretary of Agriculture to further promote the dairy industry of the country, in our opinion is exceedingly important and would be a great help to the Southern States. Our State has just started in the dairy industry and our individual dairymen need the help and advice that the Government could give them through its experts. We do not think that there is a more worthy undertaking, nor one that will mean more for our people, and we hope that you will succeed.

With best wishes, we remain,

Yours, very truly,

NEW ORLEANS PURE MILK COMPANY (LIMITED).
Per GEO. A. VILLERE, *President*.

HON. A. F. LEVER,

House of Representatives, Washington, D. C.

Here is one from Alabama :

RURAL FREE DELIVERY, No. 3,
Birmingham, Ala., January 29, 1906.

DEAR SIR: Kindly accept my thanks for your letter and copy of "bill to further promote the dairy industry of United States."

This is a subject that certainly needs more attention and knowledge, especially in the South.

The Northern States are undoubtedly further advanced on this part of agriculture.

I believe there are the greatest possibilities for this great industry in the Southern States, but we need more knowledge and intelligence to further its cause.

Speaking from a practical point of view, cooperation and dairy intelligence are what we seem to lack.

We need more study of its greatest factor, the cow; its breed, treatment, more knowledge of veterinary science, and practical laws that govern sanitation.

The latter point is one in which I think, as a general rule, we are very deficient in. Dairymen generally do not seem to realize the importance of the sanitary conditions that are needed to make milk and its products a really wholesome food.

They don't seem to comprehend the methods that promote sanitation, and this is one thing above all others that needs more of our care.

I think the plan of having a dairy expert in each State would be admirable. A man who could visit the dairymen and give them practical knowledge would make them take more interest and give them more intelligence on one of the most interesting and most important of agricultural pursuits.

Trusting you will have success and carry your point with full force.

Respectfully, yours,

DR. R. A. BERRY,
By GERALD W. HUMPHREY, *Manager.*

HON. A. F. LEVER,
House of Representatives, Washington, D. C.

Mr. B. B. Simms, of Talladega, Ala., writes as follows:

TALLADEGA, ALA., January 27, 1906.

DEAR SIR: Yours containing copy of a bill to further promote the dairy industry of the United States, to hand. I heartily indorse the measure and hope you will have no trouble in getting it through. That industry is sadly in need of help in the Southern States.

With best wishes, I am,

Very truly,

B. B. SIMMS.

HON. A. F. LEVER,
House of Representatives, Washington, D. C.

This is from Commerce, Ga., from Mr. W. L. Williamson:

GEORGIA CHEMICAL WORKS,
Commerce, Ga., January 27, 1906.

DEAR SIR: I am in receipt of your favor of the 24th instant in reference to H. R. 12612, "A bill to further promote the dairy industry of the United States," and it gives me much pleasure to give my indorsement to the effort you are making to further the dairy industry of the country.

I hope you will succeed in having a favorable report from the Committee on Agriculture, and that this report will be followed up by enacting the bill into law.

Yours, truly,

W. L. WILLIAMSON.

HON. A. F. LEVER,
House of Representatives, Washington, D. C.

Mr. LEVER (continuing). By the way, he is raising the finest kind of butter, I understand, at the cost of 8 cents per pound, as shown by his books.

Here is a letter from the Georgia Dairy and Live Stock Association, Experiment, Ga.:

I do not know of any industry in the South that has greater need or will show better results from a Congressional appropriation than the dairy industry. It is most hopeful to the faithful devotees of this work to see any movement made by Congress looking toward this end, and especially to see one of our neighbor southern Congressmen introducing such a bill. I beg to say that you will have the most hearty support and cooperation of all Georgia dairymen in this work, as well as the cooperation of the Georgia Experiment Station, as far as lies in its power.

Here is a letter from Milledgeville, Ga.:

MILLEDGEVILLE, GA., February 6, 1906.

DEAR SIR: Your favor of the 24th instant to hand and noted. In reply beg to say that I think you are working in the right direction. The South needs developing in dairying, and I believe we have a great future, and in any way that I can serve you I am yours to command.

Hoping that you will succeed in getting your bill and appropriation through, I beg to remain,

Yours, truly,

J. C. SHANKLIN.

Hon. A. F. LEVER,
Washington, D. C.

From the great State of Texas comes this letter, signed by Mr. W. R. Spann, president of the Texas State Dairy Association:

As president of the Texas State Dairymen's Association I am in close touch with the dairy conditions of this section and know that the Department of Agriculture could, if it had available funds, greatly aid the development of this great industry, so well adapted to many sections of our country. I think your bill a good one and should receive hearty support. Dairying contributes greatly to the general welfare wherever it is developed.

Very truly,

W. R. SPANN,
President of Texas State Dairy Association.

From Houston, Tex., comes this letter, signed by G. C. Street. He says:

There is no question but the dairying interest would be largely benefited, and in the South particularly this interest could be enormously increased if the people were educated even in a limited way as to the requirements of this industry. I cheerfully indorse your plan, and if I can be of any assistance to you call on me.

Yours, truly,

G. C. STREET.

Now, Mr. Chairman, from the great State of South Carolina, in my judgment, the greatest in the Union, comes this letter:

SOUTHERN COTTON ASSOCIATION,
SOUTH CAROLINA STATE DIVISION,
Columbia, S. C., February 1, 1906.

MY DEAR SIR: Yours of the 26th ultimo just to hand and contents noted.

I beg to say that I have just read H. R. bill No. 12612, introduced by you on January 20, an appropriation of \$20,000 to promote the dairy industry of the United States. I beg to say it is a good step in the right direction, and with what experience I have had in the dairy business, that in cooperation with the Agricultural Department will aid very much the experienced as well as the inexperienced dairymen.

As you know, at this enlightened age we must have the latest and best of everything in order to succeed.

I wish to say again that I heartily indorse your bill and trust you will be successful in carrying it through.

Yours, very respectfully,

F. H. HYATT,
Treasurer Southern Cotton Association,
South Carolina Division.

Hon. A. F. LEVER,
Washington, D. C.

Mr. Hyatt, as you may remember, appeared here several years ago. He is not only president of the Good Roads Association of the State, but is also the treasurer of the Cotton Association of South Carolina, and in addition to that is a practical dairyman. He is a man of considerable means and very considerable ability.

This letter is from Mr. J. G. Anderson, of Rockhill, S. C.:

DEAR SIR: I hope your bill will become law. We certainly need help in this country in the dairy business, as it is in its infancy and the people do not know enough about it to appreciate its possibilities. I am trying to establish a small plant myself, and wrote the Agricultural Department a few days ago if I could get an expert for awhile to help me get underway, but it had no one to send me. Your bill is just the thing. I wish it was in force now.

Yours, etc.,

J. G. ANDERSON.

I now read from a letter received from Elbert E. Perry & Son, of Easley, S. C.:

We are interested in the first cheese factory ever started up in this State, known as the Georges Creek Cheese Company. We are now in our fourth year in the business, and we certainly know what it is to feel the need of information and advice such as only an expert in the business could give, and we most heartily commend your efforts along this line and hope you may be able to get your bill through and get the appropriation.

We think if our people only had more light on the subject they would engage in the business, and it would be better for them and better for the country. We have the finest dairy country on earth. All we have to do is to develop it along that line.

Yours, respectfully,

ELBERT E. PERRY & SON.

The CHAIRMAN. From what part of the State is that?

Mr. LEVER. The northern part of the State, on the North Carolina line.

The CHAIRMAN. Some elevation there, is there?

Mr. LEVER. Yes; the land is inclined to be rolling and hilly. This letter is from Winnsboro, S. C.

The CHAIRMAN. Any limestone at all down there?

Mr. LEVER. Yes; that land has some limestone in it. This is from Winnsboro, in the central part of the State, from Sam C. Cathcart, who belongs to one of the old families and is a large cotton planter. He writes:

I am heartily in favor of anything that will encourage and stimulate the cattle and dairy industry in the Southern States, for on it depends the prosperity of the South. Without it the lands will soon become exhausted of fertility and rendered unfit for agricultural purposes. What a blessing it would be if every plantation would keep as many head of cattle as they raise bales of cotton.

I am glad to see the Division of Animal Industry in this country is beginning to see the necessity of awakening the farmers, especially of the Southern States, to the necessity of keeping more and better cattle, especially dairy cows.

I have been dairying for the past eight years, and find it very profitable, although I raise cotton averaging 100 bales each year. It would not be possible to make as much out of the land if I had not the cattle. My herd numbers about 100 head the year round. In winter I feed them cotton-seed meal and hulls, with pea-vine hay and corn stover. Milch cows do well on this feed and young cattle grow nicely during the winter. By keeping milch cows I find a ready market for all of the hay, oat straw, and roughness raised on the farm by feeding to my cattle, and a splendid market for butter and cream, especially butter. Sell all I make, and could sell a great deal more, at 25 cents per pound the whole year.

Any information I can give you will be freely given, and hope you will use every effort to encourage the cattle and dairy industry in the Southern States, and especially in South Carolina.

Yours, truly,

SAM C. CATHCART.

This is a letter, Mr. Chairman, from president of the Live Stock Association of South Carolina, Mr. B. Harris, of Pendleton, in the upper part of the State. He writes:

SOUTH CAROLINA LIVE STOCK ASSOCIATION,
Pendleton, S. C., January 27, 1906.

DEAR SIR: Yours of the 24th with bill to hand. Had read it in the State a few days ago with a great deal of interest.

If you can get this appropriation, it would mean more to the South than anything else that has come her way lately.

Your plan is right in regard to having an expert visit the leading dairymen of the State. There is no State in the Union that has more natural advantages for dairying than South Carolina. All that is needed is proper development. I have been in the dairy business for twenty years. We have a herd of over 100 head of Jerseys.

If I can be of any service in this line at any time, do not hesitate to call on me. When you are passing this way would be glad to have you stop over and see the farm.

Yours, truly,

B. HARRIS.

Hon. A. F. LEVER, *Washington, D. C.*

I now read a letter from State Senator C. H. Carpenter:

About three years ago I became convinced that the raising of cattle along with our other farming operations was a necessity. Lack of a suitable market made butter making an undesirable undertaking; but if we could make cheese, a near market was not such a necessity. We opened the first cheese plant in this State. We met with a fair amount of success; but every step we took was an experiment, and experiments are costly, and had it not been that we were enthusiastic we would have given up the undertaking. But about ten months back Professor Webster, Chief of the Bureau of Dairying, visited our plant, and he with Professor Rawl, who is one of his assistants, so helped us by their encouragement, advice, and expert assistance that to-day you can see silos and up-to-date barns where there would have been nothing had they not visited us, and we are convinced that this undertaking, encouraged by their timely assistance, will be the means of developing a great industry in our State.

I would be glad for you to see Professor Webster in reference to these facts. Most heartily do I approve of the bill.

Yours, truly,

C. H. CARPENTER,
Member of State Senate.

I have this letter from Mr. Wade Stackhouse, secretary and treasurer of the Dillon Storage Company and president of the Marion County Cotton Growers' Association:

DILLON STORAGE COMPANY,
Dillon, S. C., February 8, 1906.

DEAR SIR: Your bill in Congress authorizing an appropriation of \$20,000 for fostering and developing the dairy industry of the country, and particularly in the South, is highly indorsed by our people.

At a meeting of the Marion County Cotton Growers' Association, at Marion, S. C., on February 5, your bill before Congress was read, and those favoring resolution were asked to vote. More than 100 representative farmers present unanimously voted favoring the passage of your resolution and not a single vote against it. We are beginning to appreciate that the all-cotton system is ruinous to the fertility of our section and to the prosperity of our association. We would like it demonstrated that money can be made in the dairy business, believing we could induce diversified farming in this section.

On February 6 we had a rally of cotton growers at Dillon, S. C., and your same resolution was unanimously adopted by about 50 representative farmers present. I was instructed to write you regarding adoption of said resolution.

Yours, very truly,

WADE STACKHOUSE,
President Marion County Cotton Association.

Hon. A. F. LEVER, *Washington, D. C.*

Marion County is in the southern part of the State, the south central part of the State.

This morning I am in receipt of this resolution from the South Carolina Live Stock Association:

SOUTH CAROLINA LIVE STOCK ASSOCIATION,
Columbia, S. C., February 10, 1906.

Whereas a bill has been introduced in Congress by Hon. A. F. Lever, of South Carolina, appropriating for the Department of Agriculture the sum of \$20,000 to be used in the development of the dairy industry in sections where assistance is needed;

Be it resolved, That this association expresses to Mr. Lever its very hearty appreciation of the importance of this bill to South Carolina, as this State is greatly in need of assistance in this line.

B. HARRIS,
President South Carolina Live Stock Association.

That association was in session three days last week, in Columbia, the capital of the State.

Now, Mr. Chairman, I inclosed a copy of my bill to the Secretary of Agriculture and asked him to kindly give me his opinion as to the advisability of its being passed, and in reply I have this letter from him dated January 25, 1906:

SIR: I have your letter of the 24th inclosing, for an expression of my opinion, a copy of House bill 12612, To further promote the dairy industry of the United States.

I have no hesitation in saying that the Department of Agriculture could wisely and judiciously expend the amount of money mentioned in your bill, namely, \$20,000. There are many States in the Union where dairying has not been put in practice, and the dairy cow is a necessity as the center of the farm around which all other interests should be grouped. Localities should make their own dairy products, and this Department can, advantageously to the country, study conditions in States where dairying is not now common and help people toward successful work along this line.

In addition to these letters I have read I have a stack of 50 on my table, but I made a choice of these as best representing the sentiment, as I could get it, from various sections of the South. I hardly think it necessary for me to say more than this. I think each member of the committee will recognize the fact that this is a very important proposition.

Practically no dairying is done in my State. I think we have not more than a dozen dairy farms in South Carolina.

I want to say here, too, Mr. Chairman, that my colleague, Mr. Legare, representing the Charleston district, was quite anxious to appear before this committee and reenforce my ideas.

He is a practicable dairyman and he tells me that Mr. Rawl, Professor Webster's assistant, practically saved his dairy business last summer by coming down there and solving a few of the questions in connection with his business, upon which he needed help, and in that connection it is interesting to note that an epidemic of typhoid fever has broken out in Charleston now, is raging at this time, and that every dairy in that city, upon order of the board of health, has been shut down except the dairy of Mr. Legare; and Mr. Legare has given it to me as his opinion that except for the information given to him by Mr. Rawl of the Department of Agriculture, perhaps his dairy would have gone out of business along with the others.

The CHAIRMAN. Have they shut down these dairies on the suspicion that they were propagating the typhoid fever?

Mr. LEVER. Yes; that is the idea. I say this is only an illustration of this kind of work with our people. It is a new industry with us; our people know very little about it. I would say, too, that our farmers are extremely conservative; you must hit them hard before you can make them open their eyes to the possibilities about them. I do not believe there is a section in the world that promises more than the South, and yet our people are continuing to plant cotton as their fathers and forefathers did years and years ago.

Of course, we are getting rich at it at 10 and 12 cents and 14 cents a pound, but I know of the time in my own experience when I was selling cotton, and my father was selling cotton, at 4 cents a pound, actually below the cost of production, and in view of the fact that the experts of the Department tell us that the boll weevil is bound to come sooner or later, I think it is incumbent upon the Congress of the United States in every way possible to help our people to prepare for such an emergency, just as it is aiding us in the matter of diversified farming, through Doctor Spillman. There is no use for the committee to think that they can send bulletins down there and teach those people to go into the dairy business, because that can not be done. Bulletins are all right for the fellows that already know their business, but they do not amount to a row of pins, in my judgment, in instructing the fellows who do not know anything about the business in inducing them to go into the business, and the only way you can open the eyes of the southern farmer is to demonstrate the fact to him personally.

Mr. BROOKS. I notice your bill is rather broad in its terms; that this money is to be expended through the dairy division of the Department of Agriculture, and I suppose you rely upon the discretion of the Secretary as to the location in which the work is to be done.

Mr. LEVER. Entirely; yes, sir.

Mr. BROOKS. And is it your thought that you would establish experiment plants or anything of the kind?

Mr. LEVER. Not at all; my idea is to increase the appropriation for the dairy division in order to enable them to employ more experts.

Mr. BROOKS. Have a traveling representative?

Mr. LEVER. Have a traveling representative to go from State to State, and while I speak of the South, I think that if in the discretion of the Secretary he thought that some other State should receive benefit under this bill, he would have the right to send his experts there.

The CHAIRMAN. Before you leave that, I would like to ask you something about this typhoid germ. The typhoid germ was taken up through the water that the cows drank, probably?

Mr. LEVER. I don't know about that.

The CHAIRMAN. Have you any information on that, Mr. Webster?

Mr. WEBSTER. I have not; only Mr. Legare saw me the other day in regard to this same matter, and I know from the condition of the city water supply and sewerage system, and the fact that in the city there are something like 2,000 cows, the city authorities have thought it wise to take hold of it and shut off these dairies.

The CHAIRMAN. What do they do with the water supply of the city?

Mr. WEBSTER. They have not done anything with that.

The CHAIRMAN. Are they not getting the cart before the horse, then?

Mr. LEVER. This typhoid-fever epidemic is quite recent—within the last day or two?

Mr. WEBSTER. Within the last week.

The CHAIRMAN. And the dairies are shut down?

Mr. LEVER. Yes, with the exception of Mr. Legare's dairy.

The CHAIRMAN. It is true that the typhoid gerin has to be taken into the system through the stomach, is it not?

Mr. WEBSTER. I think so; I am not an expert on that.

The CHAIRMAN. Is that so, Mr. Hayes?

Mr. HAYES. Yes, that is practically so.

The CHAIRMAN. Then the only way the cow could be affected would be by the water the cow drank?

Mr. HAYES. Unless it was through the water from the pump in the process of washing out the cans. The germs multiply very rapidly in the milk, so if a little got into a can they would spread very rapidly.

The CHAIRMAN. Do you want Mr. Webster to speak?

Mr. LEVER. Yes. I have referred the bill to Mr. Webster, and I think he can take care of the matter.

STATEMENT OF MR. WEBSTER.

Mr. Chairman and members of the committee, I think Mr. Lever has explained to you the needs of the South on this line of work, and in looking over this field last year I was struck with the fact that we were doing a one-sided work in the South, that we were helping the Southern cotton grower to grow other crops besides cotton, but that we were not helping him to feed those crops on his own farm and take care of them, which he must do to succeed, to be prosperous. I think there is no greater work the dairy division could do than to go down there and teach these farmers how to feed these crops.

Mr. HAUGEN. How about Mr. Legare?

Mr. WEBSTER. The trouble with him was in taking care of his milk; he had to sell it within ten hours after he milked; he had to sell it in Charleston, and the men in charge did not know the first thing about keeping it clean or handling it. My representative went down there, and in about six hours' time, by going into the stables and showing him how to cool his milk and keep it clean, and then by following it into town and showing him how to distribute it there, he showed Mr. Legare how to obviate all his difficulties. That is an illustration of the difficulty all over the South—

Mr. HAUGEN. Does that prevent disease?

Mr. WEBSTER. There was no disease, of course.

Mr. HAUGEN. This typhoid fever?

Mr. WEBSTER. No, sir; that would not of itself prevent it.

Mr. HAUGEN. Why is it that his product is admitted into the city, and not the others?

Mr. WEBSTER. Because he has taken pains to clean up his place and furnish a good article of milk.

Mr. HAUGEN. Then all he has done above the others is to keep everything clean?

Mr. WEBSTER. Yes.

Mr. HAUGEN. The water has nothing to do with it, and the feed has nothing to do with it?

Mr. WEBSTER. No; the people there have learned in the last four or five or six months that Mr. Legare is furnishing a good clean product.

Mr. HAUGEN. Is it necessary that he or any other dairyman should send for an expert to make it plain to him that it is necessary to keep the milk clean?

Mr. WEBSTER. It is necessary, because they know nothing about the system of dairying at all. As Mr. Lever said, we could send any number of bulletins down there and they would not do any good; it is personal instruction that they want. That is one thing of many that is in the way. This man happens to know how to get good animals and how to take care of them, but in nine hundred and ninety-nine cases out of a thousand men who want to go into dairying don't know that, and somebody has to teach them that, how to get the animal.

The CHAIRMAN. The organization has failed; the bulletins have failed; and now how are you going to accomplish the desired result?

Mr. WEBSTER. The organization Mr. Lever has referred to is not a dairy organization proper.

The CHAIRMAN. It is one of its features.

Mr. WEBSTER. It is one of its features, yes; and the thing we want to do is to point out these successful dairymen to other dairymen in the State and get them to study their methods, the way they have done it, on the ground; because if they see an object lesson in New York or Wisconsin they do not pay any attention to it, because the conditions are so different up there, but if they have an object lesson in their own State they will profit by it.

The CHAIRMAN. But they are scattered, even in the State of South Carolina, if you only have a dozen in the State.

Mr. WEBSTER. They are scattered, yes.

Mr. BOWIE. Making one demonstration, you would have to carry the other six clear across the State, would you not?

Mr. WEBSTER. We make as many of them as we can, and if necessary farmers' institutes would be organized in these places and farmers would come in the meetings there, and that part of the work has been demonstrated already there in the work of Mr. Spillman, in the Department, that you can reach the farmers if you have something to show them, and that is what we hope to do, to find the illustration right there. If we can not find it, then we want to find some man who is teachable and demonstrate it to him.

The CHAIRMAN. Do you propose to have the choice cows, fancy cows, to demonstrate to the people?

Mr. WEBSTER. You have to begin with the stock you have and build up your own herds right in that section; that is the only way it can be done, particularly south of the tick line—the quarantine line.

The CHAIRMAN. How are they to be provided with ice?

Mr. WEBSTER. The climatic conditions are something we have to study and to do some experiment work upon. We have found, though, many successful dairymen; we have found some in Georgia and some in Mississippi, and we have found a man who is making a success, and sometimes he buys ice in his own home town.

Mr. BROOKS. The reason there are less successful dairymen in the South relatively to other sections is because thus far they have not had their attention directed to it?

Mr. WEBSTER. That is the main thing.

The CHAIRMAN. Mr. Lever stated it correctly when he said that the South has been a one-crop country. They have gotten rich on cotton, and now cotton doesn't do so well, and they are going into diversified farming?

Mr. WEBSTER. Yes, sir.

Mr. ADAMS. Is not another reason the fact that they do not have pasturage in the South as they do in the North? In the North the average farmer can keep a few cows—each farmer has a pasture that will sustain a few cows; but in the South generally I think they are compelled largely to rely on the forage crops, and have to adopt a system of better management, which involves considerable trouble and work.

Mr. WEBSTER. That is the condition of things at present, but it ought not necessarily to continue. The Bermuda grass will make as good pasture, I believe, as our grass—the blue grass, for instance—in the North.

Mr. ADAMS. But that is not generally so now?

Mr. WEBSTER. No; and that is one drawback at the present time to the southern farmers going into the dairy work.

Mr. ADAMS. You can produce on 100 acres of land double the amount of milk by the soiling process than on the best land in New England, but it takes time. As an indication of what can be done as an expert (not because I was an expert), a number of years ago I attended a farmers' institute and went home with a wealthy dairyman who was ambitious to make a success. He told me his troubles. He said he did not get the amount of butter from his milk that he ought to get; he said his cows were well taken care of, well housed, and everything in tiptop shape, but his butter yield was astonishingly low, that he could not understand it. I went to the milk house with him. I found he had a long, narrow tank about two inches wider than the cans. He filled this tank with the milk cans at night and he had a small flow of cool water, about 55 or 58 degrees, running through it, and he thought he had a modern arrangement.

It was apparent that that milk was not cooled quickly enough; standing there a long time, with a large body of warm milk and a small body of cool water running through the trough, the milk did not get reduced in temperature quick enough to result in a complete separation of the cream, and the consequence was that that man had been losing for a year and a half one-third of the butter fat of his milk, by the simple failure to follow out a correct principle of dairying and cooling it quickly.

Mr. LEVER. And if he had not had bulldog tenacity he would have given it up?

Mr. ADAMS. Yes.

The CHAIRMAN. To make dairying successful in the South, what different methods from those used in the North will have to be introduced?

Mr. WEBSTER. Not any so very different. Of course they have to learn first how to grow crops, and then the rest of the dairying business there will be very similar to our northern dairy proposition.

The CHAIRMAN. Will the heat of hot, dry summers make it more difficult?

Mr. WEBSTER. It will be a little more difficult, and those are factors that we have to do some studying on, to know just what is best to do. But we find men, however, that are successful in making butter even without ice, and even in making cheese, as Mr. Carpenter wrote as to South Carolina. He is making a success of the cheese business there. His success is only an indication of what everyone in that particular region can do. Take it down at Hammond, La. There is a settlement there that is just going into the dairy business, to supply milk to New Orleans.

The CHAIRMAN. Who are the people; are they natives there?

Mr. WEBSTER. Natives there, yes.

The CHAIRMAN. They are not of the new settlers?

Mr. WEBSTER. No. They are going into dairying, and that is the big question in the South to-day. The South to-day uses in large part condensed milk; they don't know what it is to drink milk in the South.

The CHAIRMAN. Is not Charleston supplied by the cows in the immediate neighborhood?

Mr. WEBSTER. Only to a very limited extent.

The CHAIRMAN. Is their milk brought from a distance, from the North?

Mr. ADAMS. There is the best opportunity to make money in the South in the dairying business than anywhere in the United States.

Mr. BROOKS. Is that true of the whole South?

Mr. WEBSTER. Yes; the babies of the South are raised on condensed milk.

Mr. LAMB. Except in Virginia.

The CHAIRMAN. What did you tell them at this cheese factory; what mistakes did you find they were making?

Mr. WEBSTER. The main difficulty that they were having was in properly feeding their cows. They had already, by their own efforts, created a market for cheese; they were selling it at 15 cents per pound. Now, they want to know how to produce milk enough to supply their cheese factory.

The CHAIRMAN. Can they raise alfalfa there?

Mr. WEBSTER. Yes, sir.

The CHAIRMAN. Would that solve the problem as far as feed is concerned?

Mr. WEBSTER. Yes; and they can raise cowpeas.

Mr. FIELD. Would not hulls and cotton-seed meal be a very good ration for milch cows?

Mr. WEBSTER. If you don't feed too much of the hulls.

Mr. FIELD. Of course, you must not use too much.

Mr. WEBSTER. It makes a fair ration; but you have to put something else with it. Wherever I have seen a herd fed on hulls and cotton-seed meal I have seen a poor herd.

The CHAIRMAN. You say that there is a large percentage of condensed milk used throughout the South?

Mr. WEBSTER. Yes.

The CHAIRMAN. Not in the country?

Mr. WEBSTER. No; but in the cities and towns.

The CHAIRMAN. I don't think I was ever in a place in the South where I could not get a glass of buttermilk.

Mr. WEBSTER. Yes; on account of the climatic conditions, I suppose.

Mr. LEVER. That is true as to the country; but I don't believe you ever got good butter in the towns.

The CHAIRMAN. I remember I got something that I thought was about the best butter I had ever eaten at a railroad eating station in the South, and when I asked the man about it he told me it was oleomargarine. That is a rather interesting fact. I was going to the Hot Springs, Ark., one spring, and I stopped at a railroad eating house to get my supper, and as I say, the butter was so good that I asked the man where he got it, and he said "That isn't butter; that is oleomargarine." He acknowledged it, and that was the first time I ever heard a man acknowledge such a thing.

Mr. WEBSTER. You spoke about the cost of butter being 8 cents on one farm. The average cost of butter is more than what it sells for. That one man had learned the secret of feeding his cows, probably; but the average dairyman buys his feed up North somewhere. They have to learn how to feed their herds.

The CHAIRMAN. Then the problem that confronts them is more a problem of feeding than of milking?

Mr. WEBSTER. Yes; it is a problem of getting at the business; knowing how to make the crops and feeding them to the cows.

Mr. HAUGEN. Is not the labor problem the most difficult problem?

Mr. WEBSTER. Not any more than it is in the North, I believe, as there are some places in the North where it is pretty hard to get labor at all.

The CHAIRMAN. What was Mr. Legare doing wrong; what did you help him out on?

Mr. WEBSTER. Simply a sanitary proposition; he was unable to get his milk to market.

The CHAIRMAN. Because he did not properly cool it?

Mr. WEBSTER. Because he did not properly cool it, or because it was not milked in clean vessels.

The CHAIRMAN. How many cows—

Mr. WEBSTER. I think about 30 head; registered Holsteins, by the way.

Mr. LEVER. In your experience with the Southern people do you find that they are interested in this proposition; do they want to go into the dairy business?

Mr. WEBSTER. I never found a more appreciative audience; they were certainly interested in it.

Mr. FIELD. Suppose you were called now somewhere in the South to give instructions to a dairy farm, a man who has a herd of Jersey cattle and was making his butter and selling it in a near-by town, to what would you give attention first?

Mr. WEBSTER. First I would look to see how he was feeding his cows.

Mr. FIELD. I want to know what you would do. Suppose you went there now and the man was carrying on a Jersey dairy farm, what would you do first?

Mr. WEBSTER. Look over his place and see what he had in the way of stock and feed to feed them.

Mr. FIELD. Suppose he had a variety of cattle, a cross by a Jersey bull on a native cow, what would you recommend to him to do?

Mr. WEBSTER. As far as breed was concerned I would not advise one breed over another.

Mr. FIELD. Would you advise him to continue on the Jersey strain?

Mr. WEBSTER. No, because the question of breed is a man's individual taste. If he had Jerseys and was inclined that way I would advise him to get a good Jersey sire.

Mr. FIELD. Suppose he did not have Jerseys, but Holsteins or something else; every man is persuaded according to his own convictions—

Mr. WEBSTER. And to have convictions on one line is all right, but they very often want to change; they have Jerseys one year and Holsteins the next.

Mr. FIELD. Suppose you went to a dairy farm in Texas and found a mixed Jersey, would you advise him to continue with Jerseys or advise him to change to some other breed?

Mr. WEBSTER. I would want to study the question right there.

Mr. FIELD. I want to see what sort of practical advice you would give. Then what would you direct your attention to?

Mr. WEBSTER. After looking over his herd and the feed question?

Mr. FIELD. Yes.

Mr. WEBSTER. I would look to see how he was taking care of his milk, how he was taking care of his calves, what kind of a market he had, whether he could improve his conditions there.

Mr. FIELD. Suppose he was doing that all right?

Mr. TRIMBLE. Would it not depend on whether he had a market for milk or a better market for butter which he should sell?

Mr. WEBSTER. Yes; it would. If he could not dispose of his milk, it might be better for him to make butter. In Texas there would probably be creameries he could ship to.

Mr. FIELD. Now, about ice; how do you solve the problem of whether it is to his advantage to try to make butter, we will say, and, if so, what is the best way to deal with the question of ice? What would be your advice on that line?

Mr. WEBSTER. Well, I have seen a number of dairies, one in particular I would like to speak of, where they made butter without ice. The man went right down into the ground, as level as this floor; dug down about 8 feet; he built himself a double cement wall, and he put a cement roof over that, flat on top, and you could go in there and in the hottest days in summer you would find a cool room, never above 50 degrees.

Mr. FIELD. Would you advise any dairyman in the South to undertake to make butter and put it on the market in competition with other butter makers, without the use of ice?

Mr. WEBSTER. It depends somewhat on his locality and what his natural advantages might be.

Mr. FIELD. Have you ever seen any place in the South where you thought they could make butter and put it on the market in competition with other butters, without the use of ice?

Mr. WEBSTER. I have, one or two; yes.

The CHAIRMAN. Was the elevation high?

Mr. WEBSTER. Probably 900 or 1,000 feet.

The CHAIRMAN. Not higher than that?

Mr. WEBSTER. No. There is the question, of course, that every man—

The CHAIRMAN. In that locality what was it that made it cold—an unnaturally cold spring?

Mr. WEBSTER. No; in this particular locality he did not take any advantage of any water course; it was simply getting into the ground, away from the sun, and when we go into the ground we find a pretty even temperature, and by taking advantage of that and the cool nights he kept a cool room, where he could keep butter and cheese, and he had good, firm butter that he was selling, without a particle of ice.

The CHAIRMAN. Suppose you find a man with a silo growing his crops, using the native grass, with separators, using ice, having a Jersey herd of the best strain, marketing his butter at the local market or sending it abroad at about 30 cents a pound—do you think you could improve on his conditions; do you think you could offer him advice that would improve his condition?

Mr. WEBSTER. There might be things he could improve. We find the average dairy farm of the North can be improved a great deal. The average yield of butter in some of the best States is only about 150 pounds per cow a year. I have some figures here that would be of interest to the committee in regard to the shortage of supplies, you might say, in the South that may be of considerable interest to you. For instance, in Alabama they lack 16,700,000 pounds of butter to supply the needs of the people in that State alone. That is figured on the basis of the last census and the average consumption all over the United States; they lack 16,000,000 pounds of producing enough.

The CHAIRMAN. Do you calculate on the same per capita consumption in the South as in the North?

Mr. WEBSTER. Yes; but it is not really as much by quite a little. Neither butter, milk, nor cheese is consumed to as great an extent as is the case in the North.

Mr. HAUGEN. That is on account of the inability to get it.

Mr. WEBSTER. Yes; and when they get it it is too costly or is too poor, one or the other.

The CHAIRMAN. I do not think butter is as necessary as a food in the South.

Mr. ADAMS. But they eat more fat meat down there than we do.

Mr. FIELD. Bacon is what they use generally throughout the South?

Mr. LORIMER. Yes; that is my experience.

Mr. WEBSTER. That same State is short nearly 6,000,000 pounds of cheese that they would eat if they ate the average per capita.

Louisiana is 22,000,000 pounds short on butter and 5,000,000 pounds short on cheese. Georgia is 28,000,000 pounds short on butter and 8,000,000 pounds short on cheese. Texas is 11,000,000 pounds short of her consumption on butter and 11,000,000 pounds on cheese, in round numbers.

Mr. HAUGEN. Is not the whole secret in the dairy business first in the quality of the animal, and, second, in the care of the animals?

Mr. ADAMS. Yes; that is the first thing.

Mr. HAUGEN. And after that comes the making of the butter itself?

Mr. ADAMS. Yes; that is right.

Mr. HAUGEN. Now, are there not certain breeds that are adapted to the South? The Shorthorns, for instance, would not be adapted to the South—it is generally the Jersey strain, is it not?

Mr. ADAMS. You find more Jerseys in the South than in any other portion of the country.

Mr. WEBSTER. In the first place, the Jersey is a family cow, and they want a family cow in the South.

Mr. HAUGEN. Is not the trouble in the South the trouble of getting the care for the animals—the labor to take care of the cow?

Mr. WEBSTER. These men that are dairying there are doing it.

Mr. HAUGEN. I know a man that went down South from my State for the purpose of going into the dairy business, and it didn't take him long to be convinced that he had to give up that business on account of the trouble of getting labor, on account of being unable to get proper care for the animals.

Mr. ADAMS. The hardest thing on a farm in the North or the South is to get men who are competent to perform the work of the dairy business. It is more of a business than the average farm business; it requires a little higher order of business talent. When you go into the dairy business you become a manufacturer; you not only grow things, but you manufacture, and you have varied expenses, and you have to keep figures and books; you have to be a business man and deal with markets. The cow is everlastingly doing business, every day in the year, and the man in the dairy business can not work as he does in ordinary farming; he can not work as he does in a cornfield, working for a few months and getting through, because when it comes to a cow it is every day in the year. As a rule, when you get men to work for you on a farm they want a little time off, but in the dairy business it is a good deal like being in the Regular Army—your men have to be on duty all the time.

Mr. LORIMER. And as soon as you find that first-class man he soon gets into the business himself?

Mr. WEBSTER. Yes.

Mr. ADAMS. I was in the business myself for many years and I used to get up at 4 o'clock in the morning every morning, and I remember about it very well. Finally I got a little help that was some good; I succeeded in getting two good men that had been bred in the dairy business in Massachusetts. I gave them \$10 a month apiece more than the help got generally in the neighborhood. One of them knew how to handle cows, and the other knew how to sell milk, and I had more comfort for a while then than I had ever had before; but of course I could not keep them very long; one of them got married and the other went into business for himself. I have a friend who is a manufacturer in Oshkosh, and he employs 250 men. He has a large business; he makes chairs, caskets, and other articles; and he also has a little farm of 72 acres, and he has told me upon his honor that that farm gives him more trouble, so far as getting labor is concerned, than the running of that factory of 250 men.

Mr. WEBSTER. The State of South Carolina lacks 18,000,000 pounds of furnishing its own butter, and lacks 5,000,000 pounds of furnishing its own cheese.

The State of North Carolina lacks 20,000,000 pounds of furnishing its own butter, and 7,000,000 pounds of furnishing its own cheese.

The State of Tennessee lacks 10,000,000 pounds on butter and 7,000,000 pounds on cheese.

Mr. ADAMS. What do you estimate the average consumption of butter to be in the United States?

Mr. WEBSTER. I haven't those figures at my fingers' ends. There are 1,400,000,000 pounds of butter made, or something over that.

Mr. ADAMS. About 1,500,000,000 pounds, are there not?

Mr. WEBSTER. Yes; about 1,500,000,000 pounds, and there are about 70,000,000 people.

Mr. HAUGEN. No; over 80,000,000 now.

Mr. WEBSTER. Yes; that would be about 21 pounds per capita. Taking those ten States, they are short on butter 151,000,000 pounds, on the basis of 21 pounds per capita.

Mr. HAUGEN. Now, how many dairy cows; what is the average?

Mr. WEBSTER. About 125 pounds per cow in the United States. There are 63,000,000 pounds of cheese short in those States.

Mr. LEVER. What is the average price of the butter?

Mr. WEBSTER. The average price of butter is 20 cents.

Mr. ADAMS. What is the total cheese of the country; it is about 260,000,000 pounds, is it not?

Mr. WEBSTER. 299,000,000 pounds, and of that amount about 281,000,000 pounds are made at the factories.

Now, there is one problem of the South that this gentleman has not mentioned in his problems of dairying. Ninety-nine per cent of the farmers do not know that they can dairy—they don't want it—and yet they have got to go into something besides cotton, and one of the things we want to do is to show those people down there that they can go into dairying with profit; show them that they ought to produce something besides cotton, and that the dairy business is a good field for them.

The CHAIRMAN. You say dairying requires 365 days' work in the year. We have the same difficulty in my own country in regard to the labor question, yet we are diversified farmers. With the growth of Buffalo and Rochester and other cities there they finally found out that the production of milk was a tremendously profitable thing, but it has taken them a great many years to find it out. That was the stumbling block, as I have said—365 days in the year, rain or shine—and you will find that will be the great stumbling block always. It is hard to make a change in that respect.

Mr. WEBSTER. In the one-crop system, though, it is easier than where they sell something the year around; their cotton is only once a year, and the money they get from it is used up before the next crop is marketed.

I think I have covered this matter.

The CHAIRMAN. Now, tell the committee just what you propose to do if you got the appropriation. Where would you go?

Mr. WEBSTER. My first problem would be to get men familiar with the southern situation, if possible, who know the conditions in the South, and then put one man in each one of those States, if I can, the next year, to study the conditions and go around and to have this farmer and that farmer and the other farmer who is making somewhat of a success at dairying illustrate to the other farmers how he is succeeding.

Mr. TRIMBLE. Those that are willing to take hold of it?

Mr. WEBSTER. Yes. We will take hold of that farmer, then, and we will give him pointers, if possible, to improve his business; perhaps building a better barn, putting up a silo——

The CHAIRMAN. The question of barns down there is of course not so serious a question as it is with us?

Mr. WEBSTER. Not so much so, but it is a problem there, too. I would have that man be able to confine his whole time say to one State, to get all this information he can, and then we will put that in such form, not only by bulletins which we may send out, but we will be able to call the farmers together on this farm and that farm and another farm, and we will have the help of the college, or the experiment station people, and the agricultural institute workers of that State, and we will show them the dollars and cents side of it if we can.

The CHAIRMAN. What are the experiment stations doing there?

Mr. WEBSTER. They are doing a little, but you must remember that a good deal of this is not experiment work but educational work, and they can not spend the \$15,000 they get for this work, of course. They are doing some work. This man in Georgia, for instance, is very anxious to have assistants, so that he can go out and reach the people of his State. He has his salary and his stenographer, but he can not reach the people of that State—he can not go out over the State. If we can send a man into that State who can do the traveling and pick out this farmer and that farmer and the other farmer, and work in cooperation with this man, we will not only double the value of his work, but we make his work probably four times more valuable.

The CHAIRMAN. Are there any dairy experiments that have been made at those stations?

Mr. WEBSTER. No.

The CHAIRMAN. I should think that they would realize the need of making those experiments.

Mr. WEBSTER. Their first question is feeding and taking care of the stock.

Mr. HAYES. Could you not induce those experiment stations to cooperate with you generally?

Mr. WEBSTER. We have now letters from practically the director of every experiment station in the South, who are anxious and are asking us to help them out along this line. They are anxious to get this aid.

The CHAIRMAN. If it is so vital to the State, say the State of South Carolina, why does not the State of South Carolina give some money to that station?

Mr. WEBSTER. As we said, there are only about eight dairymen in the State.

The CHAIRMAN. There are only eight dairymen in the State?

Mr. WEBSTER. Only about eight that are strictly dairymen, you might say. There are some men that are milking two or three cows.

The CHAIRMAN. Every planter keeps at least two or three cows, does he not?

Mr. WEBSTER. He is not considered a dairyman.

Mr. HAUGEN. One has been instructed; there are only six more to be instructed.

Mr. WEBSTER. What is the population?

Mr. LEVER. About 1,500,000.

Mr. WEBSTER. There are only six out of 6,000 or 8,000 that might be in the dairy business; if we could get 500 or a thousand or two thousand to take up dairying—

Mr. ADAMS. How many counties are there?

Mr. LEVER. Forty-odd.

I would like to say, Mr. Chairman, in reference to the question that you asked about why does not the State take care of it, let me suggest that our people are just now getting on their feet. You understand the situation that confronted us about forty years ago. We are just now coming to the point where we are able to help ourselves. Our State is very badly in debt, and I think that is true generally of the Southern States. It is very difficult to get an appropriation from the legislature down there for any purpose whatever. That is absolutely true.

Mr. HAUGEN. You have an experiment station down there?

Mr. LEVER. Yes; but it is supported largely by the Government up here.

Mr. WEBSTER. They get \$15,000, but they do not get anything from the State.

The CHAIRMAN. How many people do you think you would employ going around in the way you have described?

Mr. WEBSTER. There are about 10 or 12 States, perhaps, where we ought to do work. We ought to have one man in at least every one of those States

The CHAIRMAN. What salary do you propose to pay them?

Mr. WEBSTER. It would depend on the caliber of the men.

The CHAIRMAN. Well, what would be about the average salary you would want to pay them?

Mr. WEBSTER. \$900 up to 1,200 or \$1,400, whatever we have to pay.

The CHAIRMAN. And expenses?

Mr. WEBSTER. And expenses; yes.

The CHAIRMAN. Take South Carolina; if there are only eight people that you want to teach now, one man could cover more than one State easy enough, could he not?

Mr. WEBSTER. He has got to visit those eight people and stay quite a little while with them in order to determine just their line of work, and then he has got to go out and get 8 more men, or 10 more men, or 50 more men, or perhaps 100 more men.

The CHAIRMAN. You have to make those first 8 successful first?

Mr. WEBSTER. There are demands coming in now all the time for assistance, not financial, but they want us to help them out by telling them what to do, and while there are only 8 there we have hundreds of letters—

Mr. HAUGEN. This man in his letter tells us that you told him all that was required is three hours, does he not?

Mr. WEBSTER. But he was a dairyman.

Mr. HAUGEN. If that is the dairying interest that has been developed in forty years I don't know whether they have a good organization or not.

Mr. WEBSTER. That has been developed in the last three or four years.

Mr. HAUGEN. That organization has not accomplished very much, then.

Mr. WEBSTER. The rank and file of the people know they have to do something; they are awake to that situation; they know that. Now, what shall we do?

Mr. HAUGEN. The question is whether there are not other things besides dairying that they could do to better advantage. I think the whole secret of the dairying business is taking care of it, and I think the labor is against you down there.

Mr. WEBSTER. We study that question, too. We find farmers now that are successful.

Mr. LEVER. We are very much obliged, Mr. Chairman and gentlemen, for the opportunity you have given us.

(Adjourned.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Tuesday, February 13, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

The CHAIRMAN. Gentlemen, we have before us this morning some gentlemen from Massachusetts and the other New England States who want to talk to us about the great spread of the brown-tail moth and the gypsy moth. Inasmuch as they are here upon the invitation of Mr. Roberts, of Massachusetts, I will ask him to be the master of ceremonies and introduce these gentlemen, and have each one say what he pleases.

Mr. ROBERTS. Thank you, Mr. Chairman. I will not now take any of the time of the committee by remarks upon my own part, but will introduce to you first Prof. A. H. Kirkland, who is in charge of the Massachusetts State work of the control and extermination of the brown-tail and gypsy moths. He has already had experience in the former work in our State on the gypsy moth.

STATEMENT OF PROF. A. H. KIRKLAND, OF MASSACHUSETTS.

Mr. Chairman and gentlemen, we have several speakers in our party this morning, and I will be brief. I would say that we were appointed by His Excellency Governor Guild to appear here before you this morning and present the claims of our State for help in fighting the brown-tail and gypsy moths. We ask for this assistance not as a matter of charity, but because we are having hard work to get money ourselves at home, so that we can not get enough for the work, and we are asking for this assistance as a matter of right, because the State has spent liberally in the last fifteen years in protecting not only itself, but all the rest of New England and the country from these pests.

Briefly, the gypsy moth was brought here in 1868 by Professor Trouvelot, of Medford, and spread from 1868 to 1888, when it became very bad over a little area in eastern Massachusetts, and stripped the fruit trees wherever it went. The municipalities tried to fight it, and they appealed to the State, and the State took up the work in 1890, and made appropriations varying from \$160,000 to \$200,000 a year, some years more and some years less. From 1890 to

1900 the State of Massachusetts spent about a million and a quarter of dollars in fighting the gypsy moth and the brown-tail moth. Before the close of 1899 the pest had been reduced to such small quantities that no one could see any damage from it. People forgot that the thing multiplied at the rate of 1 to 500, and the work was stopped.

The CHAIRMAN. That was in 1899?

Mr. KIRKLAND. At the close of 1899. The last work was done in 1900. Everything stopped February 1, 1900. In the five years that elapsed when nothing was done these scattering moth colonies simply multiplied and increased until in 1903 we had a tremendous gypsy-moth outbreak, followed in 1904 by one that was worse, and in 1905, in May, a bill was passed giving an appropriation of \$300,000 to take up this work—to pick it up where it was dropped—and prosecute it as vigorously as possible. The first work was to develop the territory and see how far the moth had gone. We had in 1869 150 square miles. We organized men and sent them out from town to town, and they pushed on, as fast as they found the moth in one town, to the next, and finally it developed that in five years the pest had spread over 2,224 square miles.

The amount of harm done was simply tremendous. Real estate was made unrentable and in some places unsalable. Mortgages were foreclosed on property because tenants could not be found for it, and the havoc wrought in fruit and shade trees has been pitiful. We have found, Mr. Chairman, that since the moth has become abundant in this central district the spreading outward has gone on at a tremendous pace. It has spread northward to Portsmouth, N. H., and possibly to Maine, and southward to Cape Cod, and westward to Marlboro, 40 miles west of Boston.

The CHAIRMAN. Is that as far west as it has gotten in Massachusetts?

Mr. KIRKLAND. At the present time. There is also a large colony in Providence. The brown-tail moth occurs in Rhode Island. It occurs in the eastern half of Massachusetts, the southern and central parts of New Hampshire, and throughout southern Maine to Eastport. The work of the gypsy moth has been, of course, most important, from the fact that it kills trees, aside from all the damage it does in the ruining of crops and orchards and shade trees. When it has stripped any kind of deciduous trees 3 years in succession it kills the tree absolutely. The pines and spruces and hemlocks all die with one stripping.

The CHAIRMAN. Does it attack a pine tree?

Mr. KIRKLAND. Yes. The figures will show you that it does, and kills it in a single year. There are many cases where the moth has multiplied in woodlands and orchards, and run out of food, and then it comes down to the garden crops, and then to the grass, and makes a clean sweep wherever it goes. This last summer I knew of a market gardener who lost his entire crop from the moths from the woodland near by. They increased and multiplied in there until they simply boiled over and took his entire crop. That was on Mr. Charles Cummings's property in Burlington, Mass.

The spread of this moth has been greatly increased since the automobile came into such universal use. The caterpillars swing down by their threads from the trees and are caught on passing vehicles and are picked up on the wheels of automobiles and are carried for

miles. In New York and Pennsylvania and New Jersey we know that the spread has gone on at a tremendous pace since the automobile came in, and since these badly infested districts were allowed to shed down from the trees thousands of caterpillars over the highways to be picked up and carried around.

Now, it appears to me that it is the function of the National Government to assist us in stopping the spread of this pest from one section to another. It occurs in three States, as I have said, already. Unless we can have a large amount of money for the next two or three years we can not stop that spreading. We have made the best effort we can to get our highways in good condition and have neglected the private lands of the people.

But the experiments can not be carried on to the maximum efficiency, and we can not do as much as we ought to do in the next year. It seems to me that the National Government might well assist us in preventing the spread of this pest into the unoccupied territory, and I believe we have shown in Massachusetts the faith that is in us. We have spent liberally of our State funds. We have now appropriations running up to over a million and a half dollars in this work. For ten years Massachusetts protected the other States. In protecting herself she took care of the New England States and kept the pest out of them, and the problem has gotten now to the point where it does not seem likely that our legislature will provide sufficient funds to do all that needs to be done.

If we can have national aid, we will take our own State appropriation and fight our own battles in the woodlands and in the residential districts, and that is the plea on which we ask for favorable consideration of the matter.

The CHAIRMAN. You say in 1899 you had it entirely exterminated?

Mr. KIRKLAND. Yes, sir; we had it entirely under control.

The CHAIRMAN. What means did you employ?

Mr. KIRKLAND. In the winter time when these egg clusters were on the trees we had men going around and creosoting them. They are yellow and very conspicuous. In the winter time we sprayed the trees; we used poison, and we burlapped them to keep the moths under the poison, and killed them by hand. But the principal means is spraying and killing the moths in the winter. Also much can be done by following really good forestry practice—reducing the number of trees per acre, so as to keep down the cost of the work.

Mr. HASKINS. I do not recall the name of the town, but I saw an item in one of the papers the other day that they had gotten up into the State of New Hampshire, into Merrimac or Rockingham County. Do you recollect about that?

Mr. KIRKLAND. When we made our scout this summer we found it from Methuen to Salisbury at the sea. At my suggestion, they hired one of my expert men and he found the gypsy moth scattered the whole length of the seacoast to Portsmouth. Work was not carried beyond Portsmouth. The brown-tail moth is away up into New Hampshire.

The CHAIRMAN. Is he as destructive as the gypsy moth?

Mr. KIRKLAND. No, sir. The brown tail works first of all on fruit trees, and then attacks oaks. This brown-tail moth is up in the tips of the twigs in the winter time and can be seen and cut off by anyone

who has gumption. Any man who has the time and the disposition to do it can fight the brown-tail moth in his orchard and fruit trees. The cost of fighting the gypsy moth is five to ten times the cost of fighting the brown-tail moth. The brown-tail moth spreads by flight. The female flies, and is caught by the wind and is drifted for long distances. It has spread since 1897 two or three times the area occupied by the gypsy moth. The gypsy moth spreads by teams. If it ever gets generally spread, we are going to have a pretty hard time, and we must hold it in check until such time as my good friend Doctor Howard is able to get his parasites over and in working order to control them.

The CHAIRMAN. You say that the caterpillars swing down?

Mr. KIRKLAND. Yes, sir. I drove through New Bedford some time ago, and just as a matter of curiosity I stopped and counted the number of caterpillars that I had on my person, and I had 147 of them on me.

The CHAIRMAN. Do not the birds feed upon it?

Mr. KIRKLAND. Yes, sir; about 40 birds feed upon it, but that is not sufficient to check them.

Mr. ROBERTS. I would like to introduce Prof. Charles H. Fernald, the State entomologist of Massachusetts and one of the faculty of Amherst College, our State agricultural college.

STATEMENT OF PROF. CHARLES H. FERNALD.

Mr. Chairman, and gentlemen, the gypsy moth occurs in Europe all over the region except in the extreme north. It occurs also in the northern part of Africa, down as far perhaps as the great desert, and extends through the central part of Asia, into China and into Japan. One of my colleagues told me that he was connected with the Agricultural College of Japan sometime ago, and there was an outbreak of the gypsy moth there, and it stripped all the trees around there, and also destroyed among the vegetables and plants all the strawberries that were growing. I asked him what measures were taken. He said they were absolutely powerless and could not do anything in that stage. Now, that it is found in Europe would indicate, when we consider the climatic conditions, that its territory in this country would include the whole United States, and also the insect could possibly live in certain portions of Canada, and would extend down into Mexico, and how much farther I do not know. We are especially interested in the United States.

I am very sure, so far as I have studied the insect in Europe, and from what I know of its habits, that it is possible for that insect to spread over and into every part of the United States. That is the problem that confronts us.

The CHAIRMAN. What became of them in Japan?

Mr. FERNALD. They were restricted by natural causes. I suppose my colleague did not state that in particular, but we know there are parasites that prey upon it in that country, and it is assumed that they hold them in check the same as many of our native insects here are held in check by parasites. We have parasites that have attacked it from the first, but they do not hold it in check. I can not tell you why. We are making every effort to introduce foreign parasites.

The CHAIRMAN. He is practically held in check all over Europe by parasites?

Mr. FERNALD. There are outbreaks of it. In Russia in one year this insect broke out and devastated a territory—this is a matter of history, and I think the date was 1879 and 1880—from Kiev to Carson. I figured up that territory, and it was nearly equal to all our Atlantic States.

The CHAIRMAN. What drove him out of that territory?

Mr. FERNALD. I was not there to see, but we suppose it was the natural enemy that held him in check afterwards. It was assumed that that was the case. So that we may safely say that, unchecked, this insect may spread all over our country, and every member in Congress, I would say, would be interested in the matter sooner or later.

In regard to the destruction of this insect: Many of our insects feed on a single food plant, and they may destroy that one food plant; but here we have an insect that feeds upon about everything that comes along. I have a list of plants which he has fed upon in the State of Massachusetts, which reads as follows:

Food plants of the gypsy moth: Apple, crab apple, pear, plum, cherry, quince, apricot, lime, pomegranate, peach.

Grape, gooseberry, currant, strawberry.

Rose, wild rose, woodbine, hydrangia, wisteria, umbrella tree, barberry, poison ivy, Japanese quince, lilac.

Cabbage, dandelion, lettuce, celery, horse-radish, plantain, burdock, other weeds.

Corn, herds grass, other grasses.

Elm, linden, maple, poplar, balm of gilead, birch, beech, oak, ash, butternut, buttonwood, walnut, hickory, locust, sycamore.

Horse chestnut, ironwood, English hawthorn, catalpa, willow, hop hornbean, hazelnut, witch-hazel, wild red cherry, wild black cherry, chokecherry.

Spruce, pine, fir, larch, cedar.

Cotton plant.

When we go through that list we have not much else in Massachusetts for them to feed upon. I will mention that my friend, Mr. Kirkland, who was at that time in charge of the scientific part of the work under my direction, sent down into the South and had some fresh cotton plants sent North, and the caterpillars were put on that, and they ate the whole thing. I wonder what would be the result if this insect were allowed to spread and should get into the fields in the cotton belt.

The rapidity of distribution has been spoken of. One of the facts in this connection is that the female lays her eggs anywhere and in all sorts of places. She crawls under logs and rocks, and lays her eggs on the sides of packing boxes, and in all such places. Such a packing box might be used to ship freight abroad or to any part of the country, and in that way they might be distributed, through the cars, all over the country, just as in the days of the potato beetle they were brought East on the car lines and were spread in that way more rapidly than in any other.

As to the protection that is spoken of, it will cost a great deal of money to keep this insect, or these two insects, from spreading all over the entire country. What shall we do about it? Certainly it is better to hold the insect in check, to destroy the insect, than to let it go and spread all over the entire country. There are only three

things that can be done: exterminate the insect, hold it in check, or let it spread—let it go. I do not think that the last would be wise.

The people in central and western Massachusetts, where the insect does not appear at this time, have very cheerfully and willingly paid their tax every year for the suppression of the gypsy and brown-tail moth. Why? Because it was shown that a farmer in the western part of Massachusetts who was taxed on property worth \$50,000, with the tax as it was, about one-tenth of a mill on the dollar, 40 cents a year, supposing he had that property for 40 years before he passed it on to the next generation, would pay, as his part of the tax for keeping those insects away from him, about \$16. I own a little village lot in Amherst, Mass., and I have a few trees and shrubs on that, and I assure you I could not keep that clear, if the gypsy moth was there, for \$16 a year, even, let alone my whole lifetime. So that the people of central and western Massachusetts have looked at it in this way, that if the State would keep that insect away from them they would cheerfully pay their share of the appropriation of \$200,000 as a premium for this protection.

Now, I feel that the same thing would apply to the General Government. If California or any State in the Union would pay its share, it would be but a small sum for the protection in that way, and it would be the wisest thing to be done.

There are others to speak, and unless you have questions to ask me, I had better close.

Mr. HASKINS. As soon as they strip one forest they move forward to another, do they not?

Mr. FERNALD. Yes, sir.

Mr. HASKINS. They have to.

Mr. FERNALD. Representative Roberts asked me to give some account of the effects of the nettling hairs of the brown-tail moth on the human person. But there is at least one gentleman here who can tell you about that from personal experience.

Mr. LAMB. How did they first get over here?

Mr. FERNALD. They were brought here by a gentleman years ago, and they escaped from him.

Mr. LAMB. What did he bring them over for?

Mr. FERNALD. He was an astronomer, and he looked into the stars more than into the forests; but he sincerely regretted it, and it was an accident—their getting away from him. He brought them over with a view of crossing them to see if he could get some cocoon that would make a valuable silk, as I understand it.

Mr. ROBERTS. I would like to ask Prof. H. G. Wheeler, director of the Rhode Island experiment station, to address the committee.

STATEMENT OF PROF. H. G. WHEELER, OF RHODE ISLAND.

Mr. Chairman, and gentlemen, I come here to-day as the representative of all of the agricultural organizations of the State of Rhode Island, including our State board of agriculture. I am very sorry to say that on account of the fact that there were no laws regulating interstate traffic in the gypsy moth, it was transported to Rhode Island three years ago.

The CHAIRMAN. Three years ago?

Mr. WHEELER. Yes, sir; it was found there three years ago. It may have been transported four years ago, but we have had it with us three years. It is on the east side of the city of Providence, in the Elm wood district, and on the borders of Cranston, if not in Cranston.

Last year an act was drawn in our State, and we hoped to secure an appropriation to combat the pest, but for some reason nothing has been done; but this winter the residents of Rhode Island became thoroughly alarmed, and an act has just been passed by which we have a commissioner appointed to take the matter in charge and an appropriation of \$5,000 for the work, and an additional thousand dollars for the pay of the commissioner has been made. That bill passed a few days ago. So that we feel that it is a menace, and consequently are taking our first steps toward fighting it. We have at the present time, I have been told within two or three days, a lot of lumber which was shipped in from Massachusetts, and this lumber is covered, I was informed, with the egg clusters of the gypsy moth, and they will hatch out in the spring and start out on their travels if we are not successful in exterminating them.

So that you will see that the menace is not only from the automobile, but it also comes from other materials which are shipped from the infested region; and, furthermore, they have a custom of side-tracking cars in Massachusetts occasionally, and they are shipped out to other States, going all over the Union, and unless every car which goes out is examined there will be continual danger of this pest being carried. Now, I fear that our appropriation is not large enough to bring about the extermination of this moth, but we intend as far as possible to draw a line around the infested area and try to keep it within its limits, and also to try to have an inspection around each railway station. Railway stations are likely to be centers of infection. We feel in Rhode Island that the thing is liable to be carried at any moment by means of the New York, New Haven and Hartford Railroad, and by the large number of automobiles passing through our State, into Connecticut and New Jersey. From our standpoint the reasonable proposition seems to be to establish if possible a quarantine line.

The CHAIRMAN. It is rather remarkable that it has not been carried West by the cars long before this.

Mr. WHEELER. I think that is probably due to the fact that immediately around the railway stations there are less trees, and there is less probability of picking up caterpillars. It is impossible to pass along the highways at certain seasons of the year without the danger of picking up some of these caterpillars and transporting them.

So that about all I have to say is that to-day without exception the agricultural and horticultural interests in my State are very much exercised over this.

The CHAIRMAN. What further would you want the United States to do beyond seeking the parasite? It is doing that to-day. What would you have them do in addition to that?

Mr. WHEELER. I think to-day our Bureau of Entomology, in the Department of Agriculture, is well equipped to handle that question, and I think it is well that it be left to their judgment to handle that

thing. Yet we are face to face with this proposition, that while the gypsy moth flourishes in this country the climate may be unfavorable to the parasite, and it is possible that the parasite may never arrive. And I think the reasons for undertaking this work of extermination have been very well set forth.

The CHAIRMAN. Do I understand that parasites alone hold them in check in Europe?

Mr. WHEELER. That has been stated. Perhaps I may mention the fact that we have the army worm, which sometimes appears here and does an immense amount of damage in a single year, and its parasite then gets the upper hand and it disappears. So it has been with the gypsy moth in other countries, and it has sometimes done an enormous amount of damage in Russia and Japan and elsewhere where it has been left to spread, even though the parasite was present.

I wish to thank you for this opportunity of presenting the interests of Rhode Island in this matter.

**STATEMENT OF PROF. E. P. HITCHINGS, OF WATERVILLE, ME.,
STATE ENTOMOLOGIST.**

Mr. Chairman and gentlemen of the committee, as the gentleman before me stated that he came in the interests of the Rhode Island agricultural and horticultural organizations, I come from the good old State of Maine in the same capacity. About a year ago our State horticultural society realized the importance of an inspection, and some of their members, the secretary being one, visited Kittery, the nearest point to our neighboring State, and found that an invasion of the brown-tail moth had come to us in sufficient numbers so that we were quite alarmed over the situation, and the thing was brought to a focus by that society preparing and drawing up a bill to be presented at the session of our last legislature. That act was passed the last of February a year ago, and I was appointed, as State entomologist, under the department of agriculture, to prosecute the work.

I immediately went to York County and found the situation so serious that I returned to the Department and told our commissioner that we must have help. There was only about six short weeks left in which to do the work in the spring. As has been stated to you, the brown-tail moth places her egg cluster out on the tips of the twigs on the top of the tree, the new growth of the year. Those eggs hatching, in August the young caterpillars, averaging about 300 for a cluster, begin to form a nest for their winter's home. We had in the State at that time a gentleman—a German—quite a naturalist, who predicted that it would be impossible for those nests to survive the Maine winter. In fact, several articles came out in the papers over his signature to the effect that we need not worry about the gypsy and brown-tail moths in Maine. Now, those who are acquainted with the winters of Maine perhaps are aware that last year was one of the severest winters we have had for years, the thermometer going down to 30 and 40 degrees below zero.

I can assure you that I did not find a single nest but that the little fellows were lively as could be under those conditions. We at once put 15 men into the field. Our appropriation was only \$5,000. a mere drop in the bucket. We could not cut a single nest. Our work must

be wholly along educational lines, and these men with myself went to the different towns and cities and as fast as we discovered nests in the territory broadening we would enter those towns, and during the six weeks' time we covered 4,000 square miles of infested district in the State of Maine, extending from Kittery to Eastport, the whole coast line of the State, practically over the whole of York and Cumberland counties, into Oxford County, and clear across the State.

During that time we had letters of inquiry from summer residents. As you know, Maine depends upon her summer visitors a great deal, especially at the resorts of York Beach and York Harbor, in the town of York. In that town they took 300,000 nests of the brown-tail moth. They were so abundant that the trees in many cases could not have leaved out if left alone. The same thing is true in Kittery and in Elliott and in a number of the towns in the worst infested districts of the State.

The point thus far, it seems to me, has been more with the gypsy moth. I have had three or four occasions to inspect carefully for the gypsy moth in Maine, but to my knowledge we do not have it as yet; but I see no reason why it will not be there the coming season, as it is in Portsmouth. In regard to the spread of the brown-tail moth on the island of Mount Desert last spring, 11 nests were taken after quite a careful search. This winter they have taken about 5,000 nests.

The method of spreading, as has been intimated, is in many places by the automobile. There never were so many automobiles visiting Maine as during the past season. But those automobiles have not brought them—that is, according to my judgment—as much as have the steamers, and I will give you just one instance of that. At Bar Harbor, in August, the squadron of war ships came down there direct from Boston during the time of the flight of this moth. Those vessels anchored off what is called the coal wharves for a few days. In that section not a nest was discovered last spring, but this fall a gentleman took 160 nests right up the shore near the wharves, showing conclusively that those female moths were brought there by those vessels, and flew ashore to lay their eggs. They have been seen on the Boston steamers up the Penobscot as far as Bucksport. The female moth has been taken on board the boats. The steamers direct from Boston of course, first landing at Eastport, brought them to that most extreme eastern point of Maine.

I consider the brown-tail a very serious menace. I realize the importance of the brown-tail, but I realize that the gypsy moth is five times as bad. And yet the brown-tail is an insect that we must get rid of.

The CHAIRMAN. Where did he come from?

Mr. HITCHINGS. He is supposed to have come from Holland—an importation on rose bushes, I understand, or something of that nature.

The matter of this "nettling," this poisonous effect on the skin, has been intimated. We had cases of that in Maine this last spring, and the summer visitors were much concerned. But it seems to me, in view of the importance to the forest interests of our country, the greatest care should be exercised in regard to the coming of the gypsy moth. There is no question in my mind but what he will soon be there. The forest interests of Maine are too important to be neg-

lected, and we feel that, as has been stated, the interests of the whole nation ought to be in sympathy with this idea of the extermination, if possible, along whatever lines may seem feasible.

I thank you for your attention.

Mr. CANDLER. You speak about towns and cities more especially. Does it invade the forests outside of the cities and towns?

Mr. HITCHINGS. I was in Bar Harbor three or four weeks ago. I was called there by one of the largest owners of the island, who has done more for Bar Harbor than any other gentleman, probably, and I rode around the island, a trip of about 40 miles. I found the nests scattered along the road all the way, and, if you are familiar with the island, I will say that they were brought in from the head of Eagle Lake, away up on the top of the mountain, and they are practically scattered over the whole territory of Mount Desert.

Mr. CANDLER. Do they destroy the timber?

Mr. HITCHINGS. They destroy, as Mr. Kirkland stated, the deciduous trees. They have to be stripped consecutively for two or three years before they are killed. But when they attack a tree they never leave off. We are as badly infested with the brown-tail as they are in Massachusetts, and over about the same area, although Maine is, of course, a larger State; 4,000 square miles is about the area covered in that State.

Mr. CANDLER. The first assault is on the foliage. And if it is permitted about his personal experiences with this pest. He has had tree?

Mr. HITCHINGS. Yes, sir.

Mr. ROBERTS. I would like Congressman McCall to tell the committee about his personal experiences with this pest. He has had quite an interesting experience.

STATEMENT OF HON. S. W. McCALL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MASSACHUSETTS.

I do not want to come in at this hearing ahead of gentlemen who know something about it, these gentlemen who have come from Maine and Massachusetts, but I have a hearing before the Committee on Ways and Means which I have temporarily left to come in here and say a word. I am very heartily in favor of this bill. Some eight or ten years ago there was a bill presented in Congress to fight the gypsy moth, introduced, I think, by General Cogswell. The most of the people in the country had not heard of the gypsy moth, and they made a great deal of fun of that bill; but the experience of Massachusetts with him demonstrates, it seems to me, that unless you can manage to exterminate him, the country will wake up to the fact that he is a very serious menace—I am not sure about the sex, but as he is formidable, I refer to him as "he."

The brown-tail moth we have in my vicinity, but that we found not anywhere near so formidable as the gypsy moth. There are a few acres of land adjoining my place where I live, that belong to a good friend of mine and I have jointly with him, until this year, been fighting the brown-tail.

Last year it cost us about the amount of our local-tax bill on that land to fight the brown-tail, perhaps \$10 or \$15 an acre, \$10 an acre on the timbered part. This year the gypsy moth has not troubled

us, but it is probably going to cost us \$25 or \$30 an acre; and unless the land is valuable you can not afford to pay the expense for fighting them. This is not for one year, but it is an annual expense. If these pests get in timber you will have to let them go.

Mr. ROBERTS. You mean the individual has to let it go, and he can not afford to fight it?

Mr. McCALL. The individual can not afford to fight it, yes. I can not see why these pests should not spread over the whole country. The brown tail came across in an importation of rose bushes, I think. I do not know exactly how; but at any rate it came in some such accidental way as that, and I can not see why they should not attach themselves to freight trains or automobiles. There are a great many ways in which they can be transported to distant parts of the country.

Massachusetts has fought this pest very heroically, but it has already escaped outside of her borders. I think we have spent a million dollars in fighting it there; as much, perhaps, as any State has ever spent in fighting any pest. And if we want to accomplish something for the trees of this country and for agriculture, it seems to me that a little money spent by the Government to-day will save millions by-and-by. And I think this measure of Mr. Roberts is a very good one for the purpose.

Mr. ROBERTS. Do you know that there is a sawmill in your vicinity that is now employed in cutting up trees killed by the gypsy moth, no other lumber being sawed in it?

Mr. KIRKLAND. It is true that so many trees have been killed there that they have erected a sawmill to cut the lumber.

Mr. ROBERTS. Do you know anything about this "nettling," by the brown tail, of the human person?

Mr. McCALL. I know that many people suffer a great deal from it.

Mr. ROBERTS. Have you ever had them on you?

Mr. McCALL. Yes, sir. They have never bothered me much, but there are members of my family that have been greatly troubled with them, and have hardly been able to sleep when they would get this rash. But I would imagine that the other feature of the case was far more important from a national standpoint.

Mr. ROBERTS. I think Congressman Weeks has had some experience in that line, and I would like him to tell us about it.

STATEMENT OF HON. JOHN W. WEEKS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MASSACHUSETTS.

Mr. Chairman, I have not any technical knowledge of the moth, but it has invaded my district and my home city—the city of Newton—this last year.

It has been stated that the State has spent more than a million dollars. I think if the facts were known it would be found that the citizens, to protect their own property, had spent twice as much as the State. I spent \$100 on my own place last year, which is comparatively small. But there is a great difficulty in protecting your own property, because if there is a large piece of woodland near by, as Mr. McCall has stated, it does not pay the owner of that woodland to protect it, and the result is that the insects breed in there and blow

over into the adjoining private property, even if the owner has done everything he can to protect that property.

While this question of the "rash" which is incurred from the brown-tail moth may not be of international or even national importance, it is a serious matter. If this commission had brought doctors here to testify, they would tell you that there had been thousands of cases of serious irritation. I believe it is not poisoning, but seriously irritating. I had one instance myself, which I think came from as slight a cause as this. I was going across my lawn one night and I saw a leaf curled up and I picked it up and then dropped that leaf on the ground and put my foot on it. From that simple touching of the leaf—I suppose, of course, I put my hand to my head and face—the top of my head, which is pretty bare, was burned the next day and looked as if it had been burned with an iron. That spread to my face and my neck, and I was confined to the house for ten days and could not wear a collar.

My right eye was entirely closed by the poisoning, and irritating—and I presume it is the only case of this kind that ever happened; but the accident insurance men hearing that I was laid up in bed insisted on paying me some accident insurance. Now, there is an instance of the irritation caused by the brown-tail.

As these gentlemen who have talked to you have stated, the Commonwealth of Massachusetts has done all that it can to check the spread of the brown-tail, but unless something pretty positive and strenuous is done, I believe you are going to find a pretty large amount of damage will be done by the gypsy moth, and a good deal by the brown-tail. I wish it was possible for the committee to go on the scene of action and just see what those pests have done. I believe there is one citizen of Medford, General Lawrence, who has spent thousands of dollars protecting one fine grove; and others have spent large amounts of money trying to check and control this pest.

Mr. ROBERTS. Congressman Greene, of Massachusetts, has some familiarity with this subject.

**STATEMENT OF HON. WILLIAM S. GREENE, A REPRESENTATIVE
IN CONGRESS FROM THE STATE OF MASSACHUSETTS.**

Mr. Chairman and gentlemen, not only since I have been a member of Congress have I made an investigation of this subject, but before coming here I visited some portions of Massachusetts in connection with gentlemen from the department of agriculture of the State and examined very thoroughly the conditions that arose from the devastations of the gypsy moth; and I have noted since that the pest has spread over beyond our borders, and over a great part of the State.

There is one part of the district that I represent that has been troubled considerably with these pests, and that is Nantucket, an island of the sea. Somehow or other these moths have been transplanted there.

The CHAIRMAN. The gypsy moth?

Mr. GREENE. I could not tell you what the nature of it is.

Mr. ROBERTS. It is the brown-tail.

Mr. GREENE. I could not tell you what the nature of that insect is. I do not know what the nature of the moth may be, but they have

complained of the attack of these moths upon some of their very fine elm trees. They have some very beautiful ones. And it has been a very serious matter in the State; and it has spread throughout New England, and it is a very dangerous trouble that ought to be taken up in the larger and the broader sense. I certainly had no idea of it myself from all that I had read until I went through the section of the country that had been devastated by these pests, and then I found it was very serious. There were fine orchards and fine groves and fine trees utterly denuded of all foliage, and it looked as though a blast had been through there. And I hope that the measure may be taken up and given that broad significance that this would give.

Mr. ROBERTS. Congressman Ames is more or less troubled in his district with both the brown-tail and the gypsy moth, and I would like him to give his views of this bill.

STATEMENT OF HON. BUTLER AMES, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MASSACHUSETTS.

When I was in the Massachusetts legislature in 1897 the gypsy moth appropriation bill came before us for our consideration, and I voted for it, after a good deal of thought, and with many misgivings. In 1898 I voted against it, and I believe in 1899 the gypsy moth appropriation was defeated. That was brought about by a certain amount of what we thought was "hocus-pocus" in the administration of the department. I questioned then whether it was advisable to spend such enormous amounts of money, not really believing that the pest would spread as it has. Then it was confined to Malden and Melrose. Now it has reached away up around Lowell, and as you have heard this morning, outside of the limits of the State.

It is a serious problem and one that I confess I do not know how we are going to meet unless a parasite can be discovered that will handle it. Of course a single State or a group of States like the New England States would not have the resources or the incentive to take up such a hunt for a parasite. I can do no more than call to your attention how the thing has spread through the State in which I live, and suggest the advisability of doing something to keep it from going all over the country. I do not think I can add anything to the information that has been given to you.

Mr. ROBERTS. I would like you next to listen to General Appleton, a member of the State board of agriculture, and also of the Massachusetts Society for the promotion of Agriculture.

STATEMENT OF GEN. F. H. APPLETON OF MASSACHUSETTS.

Mr. Chairman, there was one point raised which I will try to answer if I can. If we were going to have parasites, that would not be sufficient, because it is going to be a number of years before the parasites will be in condition to be put to work, and in the meantime we seek all the help we can get to keep this pest in check until the parasites get to work. I have been an appointee of the governor of the commonwealth for several years, and was recently appointed by Governor Guild on the department of agriculture, and it is directly at his request that I am here to-day, and he is very anxious that you will lend us your aid so far as you can.

As first vice-president of an old society which was started in 1792, with four others that the Congressman has referred to—one was in Massachusetts, another in New York, and another in Pennsylvania, and another in South Carolina—I don't know where the fifth one was, but ours is the survivor—which has a little fund, and which has a board of trustees, I want to say that they feel an interest in this subject, and I am going to take the liberty of reading their names, which I think will be familiar to a number of you, and I want to say that their lands and homes are pretty well distributed all over the State of Massachusetts.

Our president is Prof. Charles S. Sargent, of Brookline, head of the United States Tree Census. Our board of trustees consists of our president; Augustus Hemenway, of Milton, who is a large landed proprietor and a great philanthropist; Francis Shaw, of Wayland; Henry S. Hamwell, of Wellesley; Gen. Stephen M. Weld, of Dedham; Nathaniel I. Bowditch, of Framingham; R. M. Saltonstall, of Newton; John E. Thayer, of Lancaster; John Lowell, of Newton; William C. Endicott, and Walter C. Bayliss; and President Eliot, of Harvard, is an honorary trustee. I wanted to mention those names. I know those gentlemen are all in accord in asking that you do everything you can to add to the work that is being done so efficiently at home. They are in favor of the bill, and the Department now is leading in its work of the study of the parasites, and we wish they might be with us also in aiding and abetting the work until the parasites get active.

There is one point I would like to make. This has been touched upon by one of the other speakers. One of the steamers between Boston and Maine was 25 miles out of sight of land and she ran into a white cloud, and it turned out to be these brown-tail moths, and they got all over the ship and all over the freight, and the men declined to handle the freight until they were furnished with brooms to sweep them off it, because they knew what discomfort this "nettling" would bring to them.

I have been a commissioner in Massachusetts myself, and also have been president of the American Forestry Association, and one of our great points is to prevent the spread further than it is to-day into the depths of the forest land, of which we have some in Massachusetts, and into those of New Hampshire and New England generally.

Mr. ROBERTS. I would like to ask Mr. W. H. Bowker, of Boston, Mass., who has had considerable experience in the work in our State, to address the committee.

STATEMENT OF MR. W. H. BOWKER, OF BOSTON, MASS.

Mr. Chairman, I was one of the original gypsy-moth commission of the State of Massachusetts. I happened to be a member of the board of agriculture, which then had the work in charge. I think that the one thing that has aroused Massachusetts to renewed effort has been the poisoning effect of the brown-tail moth. It has aroused our women, and if you could go down into the infested districts where this brown-tail moth is, particularly on the north shore, and meet some of these ladies and find them covered with this rash and suffering with this irritation, you would find how irritable they are and how apt they are to say something to you, particularly if you are supposed to know

anything about the subject, to do something. And I think that is really one of the things that has led the State to take up this work of stamping out not only the brown-tail, but the gypsy moth.

The gypsy moth has been slow in its progress, and we do not see his evil—the damage he does—until we go into the infested districts, and we do not feel it in any poisonous effects. But when we do get it in one of those districts, as I went there last Saturday afternoon, we find it very noticeable. I was perfectly astonished at the ravages he was committing. It was painful to me, lover of trees as I am, to see beautiful pine trees, some of them possibly 100 years old—I don't know how old they are—stripped and ready to be cut down, in beautiful parks and forests.

Now, there has not been a word said here to-day of the benefits of some of these evils. Congress has established a precedent for what we are asking here to-day. You have appropriated \$250,000 to exterminate the boll weevil in Texas. If you can appropriate money to exterminate or control an evil in one State, you certainly can do a similar thing, it seems to me, in another State, if we present our claim to you to help us in another State.

The boll weevil will be a blessing to this country in the future, as you know, because it will teach us better agriculture in the South. Out of the extermination of the boll weevil we can probably come to make a bale or two bales of cotton to the acre, whereas in Texas we have been growing not over one bale to four acres. So that it will result in good.

The gypsy moth has its benefit in this way, that it is calling our attention to our parks and shade trees and forests, and it is going to center our interest in those things, so that in that way it may prove a benefit in the end. But we must hedge it in, if we can. I believe that we shall soon. I think that if we can get the proper parasites we shall exterminate it.

What I should like to see this Congress do is to appropriate money and place it in the hands of the Department of Agriculture—rather in Doctor Howard's hands than in any other, for there is not a better man in the country to have charge of the work—and let the Department come to Massachusetts and direct how that money shall be spent there. I do not think we ask it that we may expend it, but we ask it that the General Government may expend it under its splendidly equipped Department.

Only one word more. A word has been said about what individuals have done. I think if we knew the amount that individuals had spent it would be double what Massachusetts has spent. Why, I understand that Gen. Samuel C. Lawrence has spent \$70,000 this last year in attempting to control this evil on his own property.

Mr. ROBERTS. He confessed to that amount?

Mr. BOWKER. Yes; he confessed to that amount. And others are doing all that they can. But when it gets out into the poor man's land, the poor man who can not afford to take it up and deal with it, then it must be dealt with by the Government, State or national. And when you look at it in that light and see how it may spread into the forests of our country, it is really a serious thing. Perhaps in ten or twenty or twenty-five years you would not see any material inroads. But we are here, as I understand it, looking for posterity a little. If we know that there is a menace here we are bound to look after the

conditions that may exist twenty-five or fifty years hence, and do all that we can. Otherwise our descendants may feel that we have been derelict in our duty.

The CHAIRMAN. Did you tell the committee that you were on the original brown-tail or gypsy moth commission?

Mr. APPLETON. Yes, sir; I was at that time a member of the board of agriculture, and at that time it was in the hands of the committee, and I was on that committee with Professor Shaler, of Harvard, and several others.

Mr. SCOTT. When were you originally appointed on that commission?

Mr. BOWKER. I think that was about in 1890.

Mr. SCOTT. Was that the first commission attempting to deal with this pest?

Mr. BOWKER. That was the second. There was a commission appointed, and we were dissatisfied with the way that commission was working, and then it was placed in the hands of the board of agriculture.

They say confession is good for the soul. I was glad to hear a gentleman confess that he voted against that bill in Massachusetts, but that he was in favor of it to-day. We have several prominent men in our State, some of them in Congress to-day, who will probably confess that they made a mistake in 1899 regarding it, and will come forward and favor some action in the matter. If certain leading men in Massachusetts had not opposed it, the work would have gone on and I think we should have had it under control, if not exterminated.

Mr. SCOTT. May I ask you a question?

Mr. BOWKER. Yes, sir.

Mr. SCOTT. I understand that the State of Massachusetts appropriated last year about \$300,000?

Mr. BOWKER. \$300,000.

Mr. SCOTT. Will you state your idea now in asking the Government to make another appropriation? Is it that the \$300,000 is not sufficient? In other words, suppose that the Government should appropriate \$200,000, would that \$200,000 accomplish any more appropriated through the Government and expended under the direction of Government officials, than it would accomplish if appropriated by the State and expended as your \$300,000 is expended?

Mr. BOWKER. I would prefer not to answer that question. I would ask you to let Mr. Kirkland answer it. He is dealing with that altogether.

The CHAIRMAN. You might answer on that, Mr. Kirkland.

Mr. KIRKLAND. The appropriation of \$300,000 made last year was made with the proviso that \$75,000 should be expended in 1905, \$150,000 in this year, and \$75,000 in 1907. That appropriation was based on an estimate of 350 square mile of infested territory. We have now found out that we have 2,224 square miles of infested territory in our own State. Then, in addition to that, there is territory in Rhode Island and the territory in New Hampshire, and possibly some in Maine. This appropriation which we are asking from Congress would be spent throughout these three or four States, because the brown-tail moth is in Maine, and is not confined to any one State.

Mr. SCOTT. Perhaps I am going over ground that has already been covered, but I would like to ask Mr. Kirkland another question, if you will pardon me. You say that the moth is infesting Rhode Island and Maine and other New England States?

Mr. KIRKLAND. The brown-tail is in four States, and the gypsy moth in three States.

Mr. SCOTT. May I ask whether any of those other States have made appropriations to combat it?

Mr. KIRKLAND. In New Hampshire—the moth is there this year, but its legislature is not in session. Maine has appropriated for the brown-tail moth, and Rhode Island has passed an appropriation for the gypsy moth.

Mr. SCOTT. The important question is this: Has your experience thus far been such as to lead you to believe that you have found effective means of combating this pest, and that it is only a question of getting money enough to do it?

Mr. KIRKLAND. Certainly; that is exactly the situation. The ten years of the old State work developed and perfected methods, methods which we can not improve on to-day, and which are absolutely effective. It is simply a question of money and trained men; and with this tremendous problem we have developed this last year—the men and the money available in Massachusetts or in any of the other States is not sufficient for the amount of work in hand. We must check the spread of the moth along the highways and let the woodlands go, or protect the people's property and let the pest spread all over the country.

Mr. SCOTT. You think if this appropriation was made it would be expended along lines already developed?

Mr. KIRKLAND. Expended effectively, yes, sir; along lines already developed.

Mr. SCOTT. It is not a question of original research?

Mr. KIRKLAND. No, sir; not a bit of it.

The CHAIRMAN. It is original research in so far as you have not found out whether the parasite will be effective in this country?

Mr. KIRKLAND. That is provided for under the State appropriation of \$10,000 in our State.

The CHAIRMAN. Suppose it should prove that the parasite is not effective?

Mr. KIRKLAND. We have not lost any of our efforts. We have been hammering away on the lines that we know to be effective of destroying the big colonies and preventing the danger of its getting over into New Hampshire or any of the other uninfested territory, Connecticut or anywhere else, and we have not lost a bit of ground, even if the parasite is a failure. We have made a gain, if we have the proper amount to expend.

Mr. SCOTT. In districts where you have made a fight against it have you exterminated it?

Mr. KIRKLAND. The work has been resumed, you must remember, after a lapse of five years. And in the previous State work from 1890 to the close of 1899 we absolutely exterminated it in considerable areas—what you might call large areas. We brought the thing under control so that there was practically no damage done, and to show you the condition of affairs, in the winter of 1900 I went with a committee

and tried to show them a tree badly infested by the gypsy moth, and we had to hunt a long time before we found a tree with thirty nests on it, while to-day I can show you trees with three thousand.

The CHAIRMAN. With the appropriation your State has now, are you gradually overtaking it, or is it getting ahead of you?

Mr. KIRKLAND. It is too short a time to tell. Of course we shall next year have a caterpillar outbreak of some size. Certainly we have made a beginning on it. We have cleaned, I should think, 75 per cent of our State trees in the infested district, and begun on our residential sections, but we have not any money at all to go into the big woodlands and take the great big colonies, which are simply a reservoir from which they overflow, and go all over the whole country.

Mr. BOWKER. It seems to me that stamping out disease among animals is comparable with this work. Now, you know we had an outbreak of the foot-and-mouth disease in Massachusetts two or three years ago, a tremendous outbreak of it, and it threatened to spread all over this country. You know what the cattlemen of the West did, how much interested they were, and how the Government took hold of it. It is a monument. I think, to the splendid work of the Department at Washington. They came in there, and in cooperation with Massachusetts it was stamped out. I do not think there is a case of it in the country to-day.

The CHAIRMAN. Who was your commissioner of agriculture at that time?

Mr. BOWKER. Wilson was here.

The CHAIRMAN. I mean in Massachusetts.

Mr. BOWKER. We do not have a commissioner of agriculture.

The CHAIRMAN. Who was the head man at that time; do you remember?

Mr. BOWKER. Doctor Peters.

The CHAIRMAN. Doctor Peters; that is the man.

Mr. BOWKER. He cooperated with Doctor Salmon, and they did splendid, vigorous work. I happened to live in the infested district of Concord, and I saw some of their work.

I think you have in the work on the boll weevil a precedent for this work, and you have in the handling of diseases a precedent for this work.

Mr. SCOTT. If I may interrupt for a moment. You will recognize a difference, I think, between this and the boll-weevil situation, as drawn out by the question which I asked just a moment ago. When the boll weevil came up there was not anybody in this country who knew anything about how to handle it—

Mr. BOWKER. Yes, sir.

Mr. SCOTT. Or what sort of methods to use either in exterminating or controlling it; and the Federal Government went into the investigation on the theory that the Department here was better equipped to do work of that kind along the lines of original research than anybody in any State of the Union was; and it was upon that theory, as I remember it, that the appropriation was made by the Federal Government. You tell us now that this is no longer a question of original research. You say that your State authorities have developed means by which the pest may be combated, and now it is simply a question of money, and it looks to me as if it presents a little different

problem from the situation which was presented by the boll weevil, and the cases are hardly parallel when it comes to basing upon them an argument for an appropriation.

Mr. BOWKER. I should hardly agree with you there. This parasite work is what we hope will be successful and there is where you can use your money. Let us use our money in trying to keep it in check as much as we can. You use the Government money on this parasite work, and carry it along on that line.

The CHAIRMAN. That would not require very much money.

Mr. BOWKER. I do not know about that; but you can also assist us, it seems to me.

The CHAIRMAN. I think you have set aside a certain amount of your appropriation to be expended by Doctor Howard, of the Agricultural Department, here?

Mr. BOWKER. Yes, sir; but you ought not to ask or expect us to do that.

Mr. HENRY. You have done that, I understand.

Mr. BOWKER. We have to a certain extent, because you have not done anything.

Mr. HENRY. Yes, we have; Dr. Howard went to Europe last year and brought back, I understand, some of the parasites.

Mr. BOWKER. But it seems to me that it has got beyond us.

Mr. CANDLER. Your people are supporting this work pretty generally through the State?

Mr. BOWKER. Yes, sir. I want to tell you that if you had the brown-tail right on those trees out there in the Capitol grounds—it looks as if there were some clusters there now, but I don't suppose they are—if you had this brown-tail here in June some of you would be immune and some of you would not be, and if you did have it here you would deal with that problem at once.

Mr. CANDLER. There is no opposition in your State now?

Mr. BOWKER. No, sir; there is no opposition, but they feel that it is becoming a national problem.

Mr. CANDLER. The last appropriation made by the legislature was practically unanimous?

Mr. BOWKER. I think almost unanimous, was it not?

Mr. KIRKLAND. Yes, sir; I think so.

Mr. BOWKER. And there is very little opposition now.

Mr. CANDLER. And the appropriation will be continued by the State as necessities require? You do not see any prospect of the State cutting off the appropriation again, as they did in 1899?

Mr. BOWKER. We shall do all we can to keep it down, but we can not work along the highways to keep it from being carried into New York or other States. We shall devote ourselves to the parks and our woodlands and the highways and byways. One reason it has been carried so much is because it broke out in our parks, which are much frequented by these automobiles and other vehicles.

Mr. CANDLER. I ask these questions because you stated a while ago that "an honest confession was good for the soul," and those who opposed it before now favored it, and I wanted to see whether that sentiment extended among the people pretty generally.

The CHAIRMAN. I will just read you what Doctor Howard said a few days ago when we had him before the committee. It is as follows (reading):

The CHAIRMAN. What beneficial insect have you introduced in the last year?

Doctor HOWARD. The work has been entirely on the parasites of the gypsy moth and brown-tail moth. You gave us last year an appropriation of \$5,000 for that purpose, and I went abroad last spring and organized a corps of correspondents there and got all the official entomologists in Germany and Italy and France to cooperate with us; and they sent us over last summer some thousands of specimens of the gypsy moth and the brown-tail moth. Over there the normal percentage of parasitism is from 60 to 70 per cent. These caterpillars were affected by several species of parasites. The parasites are now in hibernating quarters near Boston. I have brought over 100,000 wintering nests of the brown-tail moth from Europe. A certain percentage of those will probably be affected with parasites. We will separate the different kinds—the primary parasite from the secondary, and destroy the secondary and limit the primary. The work of the summer has been such that it has been shown to be a comparatively easy and inexpensive matter to import alive from Europe the parasites of those two species, and I do not see how it should not bring about a condition in Massachusetts as it has in Europe, where the insect is by no means an annual menace to forests and to fruit trees.

The CHAIRMAN. Doctor Howard, what is the difference between the primary parasite and the secondary parasite?

Doctor HOWARD. The primary insect is the insect which destroys the injurious species. The secondary parasite is the one that destroys the primary parasite.

The CHAIRMAN. I will read you a little more from what Doctor Howard said the other day:

Doctor HOWARD. Last session they made an appropriation of \$300,000, to be expended in three years—\$75,000 the first year, \$150,000 the second year, and \$75,000 the third year. Then they made an additional appropriation of \$30,000, to be expended in three years—\$10,000 in each year—for the purpose of introducing the parasites. They turned half of that money over to me and asked me to take charge of the foreign end of it for them. It is for the reason that the State of Massachusetts has contributed this money for this foreign work that we have not asked for money from Congress for the coming year for this purpose.

Mr. ROBERTS. I would like to ask Congressman Gillette to address you.

STATEMENT OF HON. F. H. GILLETTE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MASSACHUSETTS.

I am just here to show my interest in the question that is up. You may remember, Mr. Chairman, it was about six years ago—I do not recognize any of the other gentlemen here as having been on the committee at that time—that I came before you with the board of agriculture of Massachusetts urging a similar appropriation, and ever since then I have continued to be impressed with the fact that this is likely to be a national and not simply a local disaster, and it may be advantageous for the Nation as well as for our State that this should be done. And I consider as rather hard the suggestion of Mr. Scott that, for the reason that Massachusetts has appropriated \$300,000, we should not get any money from the National Government, while Texas, who has not done anything, receives large appropriations for similar purposes.

Mr. SCOTT. Did you ever hear the remark that "to him who hath shall be given, and from him who hath not shall be taken even that which he hath?"

Mr. ROBERTS. If the committee will bear with me for a few moments I will close the hearing as briefly as possible. Reference has been made to the effects of the brown-tail moth on the human being. I would like to reenforce very briefly what was said by Congressman Weeks upon that point. His case might be taken as that of thousands in the State of Massachusetts. I have myself seen hundreds of people—men, women, and children—who were suffering severely from the effects of this nettling.

I have in mind one particular case of a man who drove a team for me last summer, who came down one morning, and his face, neck, and hands—all that was visible of his body—looked as if he had been scalded, and he said that he was suffering intensely. I asked him how it had happened. He said that the night before he had taken a trolley ride some distance back into the country, and had come in contact with the fuz or fur, or whatever it is that causes this irritation, of the brown-tail moth, and it was days before he was back in normal condition. That is a feature of the brown-tail moth pest which it seems to me should not be forgotten. It is not the main contention by any means of those who seek national aid that it has this injurious effect upon the human being.

The brown-tail moth is a most serious menace to the fruit industries of the eastern United States, in my opinion. The moth spreads rapidly. It has been known in Massachusetts, in the flying period when the moth is active, to be carried to a distance of 20 or 25 miles in one night by strong winds. You have heard of instances here of a ship or steamboat going up to Maine meeting this cloud of brown-tail moths out on the ocean. We have an instance, I think it was in the city of Lawrence, which was infested in a night, and the nearest point where the moths were plentiful was 20 miles distant. Why, last summer, in the city of Lynn, a place of 80,000 people, on its main business street I noticed a store on a corner with three or four very large plate-glass windows on one side and six or eight plate-glass windows on the other side, and those windows were so covered with the brown-tail moth that it obscured everything in the show windows; and you will find in the day time the poles and trees and everything in the vicinity would be covered entirely with this moth, so that you can not see the material upon which they rest. Under the arc lights upon the streets I have seen the ground covered so that it looked like snow, and you could not see the ground.

The gypsy moth is the more serious menace of the two, because of the difficulty of eradicating it, and because of the great damage it will do when it gets into heavily wooded country. If the gypsy moth is not kept within its present limits, and gets into the forests of Maine and New Hampshire and Vermont, there will be millions and millions of dollars of damage unquestionably done by that insect. The great difficulty in handling it lies at present, perhaps, in the fact that when this moth does infest wooded land, or even private land with a considerable number of trees on it, unless the owner of that land is a man of wealth and proper spirit he absolutely can not afford to go in and do the work of extermination. You have heard of the efforts of General Lawrence upon his private estate in the city of Medford. He is a man of great wealth and public spirit. He had a fine grove upon his estate which was attacked by the gypsy moth, and he was determined to eradicate it if

possible, with the result that he confessed to spending \$70,000 in one year upon his place.

Mr. CANDLER. Did he succeed in saving his trees?

Mr. ROBERTS. I am not advised how far he has been successful. I think he held the moth in check without being able to entirely eradicate it.

It does seem to me, Mr. Chairman, that the argument of Mr. Scott, of this committee, in regard to the boll weevil, his citation of the boll weevil as an example, is merely something that strengthens the position we take in Massachusetts and in New England. In that case it was unknown territory upon which the Government was entering. They were seeking to find the remedy. We know to-day the remedy in the case of these moths.

This matter has ceased to be that of a single State. It is an interstate matter now. It is really a national matter as it stands to-day, and it seems to me the National Government may very properly step in now and endeavor to draw, so to speak, a dead line; endeavor to keep this pest within the limits within which it now extends, because if it does escape it is going to spread and cause more damage in other States where it does not now exist, and I do not think that any single State can be properly held to keeping such a pest within its borders altogether.

The State of Massachusetts has done noble work in that respect. We have protected the rest of the Union, the rest of the New England States, to the best of our ability, and have spent liberally of our money to do it. We have appropriated a million and a half dollars and have expended a million and a quarter of that amount in the effort not only to protect ourselves but our sister States, and that is but a small portion of the money that has been expended in our State in this cause. There are a few instances given—for instance, that of Mr. McCall, in which he will be compelled to pay out a thousand dollars this year to protect his private estate, and very large amounts have been and must be expended by citizens in efforts to keep this pest down.

One other point I want to call your attention to. Last year I had two bills before you, one calling for a direct appropriation of \$250,000 to be expended under the direction of the Secretary of Agriculture, and the other of \$15,000 for the research for parasites. The committee in its wisdom did not see fit to report the larger amount, nor did they give the full amount of the smaller bill, \$15,000 for parasite work, but they did authorize \$2,500 to be expended in that direction. The State of Massachusetts, out of the \$300,000 which it has appropriated, and which is now available, has set aside the sum of \$10,000 a year for three years to be used along the same lines. No; that is in addition to the other.

Mr. KIRKLAND. Yes, sir; \$30,000. It is in addition to the \$300,000, and for the purpose of procuring parasites. The State of Massachusetts has already expended more money in looking for parasites than has the National Government last year.

The CHAIRMAN. Why was it so easy for the National Government to discover the parasites? They have existed in Europe for years. I do not see why Massachusetts has spent so much money looking for them. They were there all the time.

Mr. ROBERTS. I was coming to that. The money Massachusetts has expended has been in bringing over the parasites that were discovered by Professor Howard and in paying the expenses of those who were collecting the parasites abroad. The point I wish to make is that the parasites now in this country are not brought here at the Government expense.

The CHAIRMAN. You contributed half of the \$10,000 in addition to what we appropriated?

Mr. ROBERTS. That has not been used. We set aside half of \$10,000 to be used in addition to any amount that the National Government may appropriate.

The CHAIRMAN. Has Massachusetts had special agents on the other side?

Mr. ROBERTS. Professor Howard has been our agent. I have been advised, and if I am mistaken I hope Doctor Howard will correct me, that the National Government thus far, acting under the appropriation of last year, has only paid in substance the traveling expenses of Professor Howard of that trip abroad. All other expenses in connection with the investigations, and gathering up and bringing over and the hibernating of these parasites, has been borne and is now being borne by the State of Massachusetts.

Mr. HOWARD. I can give you the exact figures if you would like to have them.

Mr. ROBERTS. Is that correct?

Mr. HOWARD. Yes, sir; substantially correct.

The CHAIRMAN. Doctor Howard said that the State authorized him to spend half of the \$10,000 a year in that work.

Mr. ROBERTS. We do not dispute that. But what we say is that any benefit of the assistance that is now being obtained from that appropriation is the result of our money and not of the Government's money, and it can not fairly be said that the National Government has done anything for us.

The CHAIRMAN. I understood you to say that Massachusetts has been trying to find a parasite.

Mr. ROBERTS. No, sir; only as they have cooperated under this last appropriation, with Professor Howard, our idea being to cooperate with the National Government. I do not think it was the intention of our people in making that appropriation that we were to pay the bills and the National Government was simply to give us the advice, but the understanding of our people was that the National Government was going to meet us halfway, or go a little further, and we think we have a right to ask, under all the circumstances of the case, that the National Government should do that much.

This is perhaps a little aside. The practice of another great committee of this House—I speak of the Rivers and Harbors Committee—is to encourage the States and localities and municipalities to do something for themselves. If a State or community will make an appropriation to do something for the improvement of its rivers and harbors, the Committee on Rivers and Harbors has always been very willing to cooperate and do something to help that proposition along. They have not taken the attitude that so long as a State was doing something itself the National Government would do nothing; and it does not seem a fair stand for anybody to take.

There is another quotation I might make to Mr. Scott, that "God helps those who help themselves;" and we are trying to help ourselves for the benefit of ourselves and for the benefit of the country.

Mr. SCOTT. I think I ought to say that my questions were not suggested by any antagonism to this measure, but simply to bring out the arguments in rebuttal to the objection that I could very easily see would be made. I wanted to see what you and the other gentlemen had to say in answer to those objections.

Mr. HENRY. I would like that you should be a little more definite in your request, to know just what you propose, and how the money should be expended.

Mr. ROBERTS. My proposition is, and I will urge this committee, to report or to incorporate in your bill the sum of \$250,000 to be expended under the direction of the Secretary of Agriculture in hemming in, if I may use that phrase, both these pests within the territory which they now infest. Secondly, I would urge upon this committee the appropriation of \$15,000, or, if they do not see fit to give that amount, a liberal portion of that, to be expended by the National Government in looking up, experimenting, and bringing over more parasites. If I understand the situation correctly, we are not certain to-day that any one of the parasites now in the country will do the work that is expected of it. Am I right in that?

Mr. HOWARD. Yes, sir; that is true.

Mr. ROBERTS. It is supposed that they will. It is known that that parasite does certain work abroad. It may do that here or may not. It is still a matter of experiment whether it will or not. So that all the money expended by the National Government and the State so far in parasite work may be a total loss. On the other hand, you may have here now the right parasite; and then it is a question of propagating them in sufficient numbers to hold the pest in check within the limits in which it exists; but that must take a series of years before there can be enough of those parasites propagated, and meanwhile the pest is spreading, and spreading rapidly, as you have heard from these gentlemen here, and if we delay a series of years in the effort to hem these pests in, by the time we have our parasites where they will begin to do any good at all the pest will be all over the country, whereas now, in comparison with the territory of the United States, it is within very narrow limits.

It has been suggested to me, and I would like to make this point, that the action we are asking from this committee to-day is exactly on all fours with the action taken by Congress with regard to the foot-and-mouth disease. In that case, as you will remember, there was no new research or investigation required. It was known what to do with the disease when it appeared. It was simply a matter of police regulation, and the Government stepped in for the benefit of the whole country, and with the cooperation of the authorities in our State, Massachusetts, policed that matter and stamped it out, and we are simply asking now of the Government to do the same thing with regard to these two pests. If you want to put it on that basis, step in as a matter of police regulation along known lines.

Mr. SCOTT. Do you not think that the governmental control over interstate commerce was a large factor in its control in its participation in the stamping out of the foot-and-mouth disease? That

goes to the fact of the control over interstate commerce, which can not be reached by State authorities.

Mr. ROBERTS. But, if I understand the case correctly, cattle in the State of Massachusetts, which would not be exported or moved out of the limits of the State, were killed by the representatives of the National Government. They were not animals that would be subject to interstate commerce or to the regulations of it.

The CHAIRMAN. They might be subject to interstate commerce.

Mr. HENRY. You advise an appropriation of \$200,000?

Mr. ROBERTS. No, sir; \$250,000, or \$265,000 for the two together; but I would make them separate so that the work could be carried on along distinctly separate lines.

Mr. HENRY. Doctor Howard is supposed to do the experimental work—that is, with this \$5,000, you suggest—but they are not in condition and not organized to fight the pest on the ground. How would you suggest that that money be expended? Without any organization, you want the money given to the State of Massachusetts?

Mr. ROBERTS. If Mr. Henry will permit me, the lines of organization for the expenditure of that money are of the simplest. They need merely copy the procedure of the State of Massachusetts.

I want to correct one impression that seems to be in your mind, Mr. Henry. We are not asking that this money, this \$250,000, be expended all within the State of Massachusetts.

Mr. HENRY. Practically that.

Mr. ROBERTS. These pests are within three or four States and we want the National Government to step in and keep them within the limits where they now exist. We want practically a quarantine established.

Mr. HENRY. You would suggest that the National Government fight the pest in New Hampshire and Rhode Island and possibly in Maine, and let Massachusetts take care of herself?

Mr. ROBERTS. Do the work wherever the necessity exists. I want to get the idea out of the minds of the committee, if it is there, that we are asking that the whole or any portion of this money be expended within the limits of Massachusetts. We want it expended wherever Professor Howard, or whoever has the work in hand, thinks it necessary.

Mr. HENRY. It would not be desirable to duplicate work. It would not be desirable for the General Government to work in the territory that Massachusetts was working in?

Mr. ROBERTS. Why, yes, indeed; along certain lines.

Mr. HENRY. On experimental lines, yes.

Mr. ROBERTS. Not on experimental lines, if you will pardon me. I do not think it would be advisable for a force of exterminators, acting under Professor Howard, to go onto a certain ground and another force of exterminators working under Professor Kirkland to go to that same place and work on that same acre of ground, for instance. My idea is that the Government should draw the quarantine line and fight this pest to keep it from spreading, just as you do down in the South when you have yellow fever, where the different communities are quarantined. I am not so very familiar with just their processes, but the different communities make a quarantine around their cities and will not let anybody in or out, and at the same time they are handling the disease inside.

The CHAIRMAN. How would you quarantine against an insect?

Mr. ROBERTS. Just as we have done in the past, by the inspection and killing off of the moth or caterpillar wherever it is being carried out. We have done that. I recall in the early stages of our work that every trolley car, or whatever form of vehicle it was, from my city going into Boston was stopped and an inspection made to see that it did not carry any of these insects. The inspection happened on a bridge, where they could best do it, and every vehicle was inspected, and these moths or caterpillars were killed. The inspection was rigid, but it was necessary, to stop it.

Mr. FIELD. Can you instance any case where the National Government has assumed to act and make an appropriation under the police power which we claim for the State?

Mr. ROBERTS. I can not give you a specific case, but I think I have in mind the provisions by the National Government for the extermination of the grasshoppers in the West, and the foot-and-mouth disease.

Mr. FIELD. The foot-and-mouth disease was purely under the interstate commerce power, was it not?

Mr. ROBERTS. I see, I think, what you have in mind. You are looking at the constitutional right of the Government to do it?

Mr. FIELD. Yes, sir; the constitutional right. As to quarantine work, is not that always under the interstate commerce power?

Mr. ROBERTS. I could see some force in your objection, or what you have in mind, provided the National Government attempted to go inside the borders of a State and do things arbitrarily.

Mr. FIELD. Could it ever invade the territory of a State, exercising police power?

Mr. ROBERTS. No, sir; I think not. But, so far as that goes, there could be no question of the right of the Government to come in and expend money.

Mr. FIELD. I wanted to see if there ever was any expenditure of money made by the National Government under what you claim here as its police power.

Mr. ROBERTS. If you will pardon me, I merely used that term as indicating the right of the Government to appropriate and expend the money, as indicating the manner in which they could do it, not as indicating the source of their power, but the method of procedure.

Mr. FIELD. In the extermination of the foot-and-mouth disease, they acted under altogether a different power than the police power.

Mr. ROBERTS. I do not know under what power the Government is acting in this boll-weevil matter. That might be considered—

Mr. FIELD. That is purely on experimental lines, and not for the purpose of exterminating, not for the purpose of quarantining it.

Mr. ROBERTS. If you will pardon me, the ultimate object must be extermination.

Mr. FIELD. The distinction was clearly made by Mr. Scott that here a remedy is known, and the question is suggested, Shall the National Government appropriate money to exterminate a pest, which you claim can be done under the police power of the Government?

Mr. ROBERTS. If I am not mistaken, under the quarantine provisions the Government could proceed under exactly the same theory that they do in quarantining against disease.

Mr. FIELD. That is under the interstate-commerce power.

Mr. ROBERTS. Then they could act under the interstate-commerce power here?

Mr. FIELD. I do not know that that would be regulating commerce.

Mr. SCOTT. The precedent undoubtedly is all against this, so far as the work of the Agricultural Department is concerned; and that is what I had in my mind in asking the questions that I did.

For instance, take the work that has been done in regard to the scale—different varieties of scale insects which were damaging the citrus orchards of the coast. This Government spent thousands of dollars in finding a way to exterminate that pest, but it has never spent a dollar in helping private owners to drive them out of their own orchards except in so far as it was done incidentally in carrying on the experiments. The work has all been done by way of research, to find a way to exterminate this pest, and when that was done the Government withdrew, and the private owners are spraying their orchards all over the country now, using a compound that the scientists of the Department have found to be effective. That was the only point that I had in mind in calling your attention to the precedent.

Mr. HASKINS. Mr. Scott, I am unable to see any difference between an appropriation of money for the extermination of the boll weevil that is destroying the cotton crop of the South, and an appropriation of money for the extermination of a pest that is destructive to the lumber regions of the North.

Mr. SCOTT. The distinction which I have in my mind, Colonel, is simply that in one case the method for extermination has already been discovered, and when the money is used it will be used in applying that method; whereas in the other case the method of extermination has not yet been discovered, or had not been at the time this appropriation was made, and this money is to be appropriated now, not to use methods which have already been developed, but to develop methods which have not heretofore been known.

Mr. ROBERTS. I would like to ask Mr. Scott if he has any knowledge of appropriations for the wiping out of the locust or the grasshopper plagues of the West.

Mr. SCOTT. Not through the Federal Government.

Mr. ROBERTS. I have been advised that such appropriations have been made.

Mr. SCOTT. Of course I speak only for Kansas. I do not know whether anything was done in any other State, but it was never done in Kansas.

Mr. ROBERTS. It was years ago.

The CHAIRMAN. The Department recommended certain remedies, just as it has for the extermination of the ground squirrel or prairie dog. Doctor Howard, are you prepared to say from your general knowledge of the subject that the parasite will be effective here?

Doctor HOWARD. We can not tell. As I said the other day, I see no reason why it should not be in the course of a few years.

The CHAIRMAN. Provided he is effective, what further work along those lines can the Government do?

Doctor HOWARD. Nothing at all, so far as I can see.

The CHAIRMAN. In attempting to destroy the moth itself, would you not destroy at the same time the parasite?

Doctor HOWARD. You would, certainly.

The CHAIRMAN. Suppose you let loose the destroyer, and you continued your efforts to destroy the moth, you would destroy the original destroyer, would you not, or, in other words, would you have to leave the work entirely to the parasite?

Doctor HOWARD. No, sir; not at all. It would be perfectly easy to distinguish parasited caterpillars from unparasited caterpillars.

The CHAIRMAN. Yes; but you could not distinguish in the use of a spray.

Doctor HOWARD. They do not use a spray in this work at all. They have other methods which were developed under the former work. They destroy the egg masses.

Mr. LAMB. They burn them?

Doctor HOWARD. Yes, sir; burn them.

The CHAIRMAN. Are there any further questions?

Mr. ROBERTS. I want to thank the committee for their courtesy in giving us this hearing. I believe that is all.

Mr. ARTHUR B. FARQUHAR, of York, Pa., appeared before the committee.

Mr. LAFEAN. Mr. Chairman and gentlemen of the committee, we have before us this morning Hon. A. B. Farquhar, of York, Pa., a very large manufacturer of farming implements. As I understand, he has had several interviews with the Secretary of Agriculture along experimental lines, and through the courtesy of the chairman he is here to fully explain this work.

The CHAIRMAN. As to what he wants the committee to do in the way of appropriations?

Mr. LAFEAN. Yes, sir.

The CHAIRMAN. Proceed, Mr. Farquhar.

STATEMENT OF MR. ARTHUR B. FARQUHAR, OF YORK, PA.

Mr. Chairman and gentlemen, the National Association of Agricultural Implement and Vehicle Manufacturers, with a capital of nearly a thousand million dollars, at their general meeting at Niagara Falls last fall, appointed a committee to confer with the Secretary of Agriculture with regard to having a test of agricultural implements. I was made chairman of the committee, and I suggested that they should all attend this morning, but they said they thought it would be unnecessary, and I have reduced what I had to say to writing, so that I would not make it too prolix. It will not take over about ten minutes.

The farmer's success, like that of the manufacturer, depends upon obtaining the greatest possible results at a minimum of cost. The scarcity of farm labor, with increase of wages, makes labor-saving machinery a necessity. Improved agricultural implements and machinery have been a most important factor in the development and the material welfare of the United States, and the success of our inventors and manufacturers has resulted in a steady decrease in the labor cost of agricultural production, notwithstanding the advance in wages. No notion would have seemed wilder a century ago than that the British Isles would some day come to look for a large part

of their daily sustenance to lands on this continent, a thousand miles from tidewater, or that the whole world was to be largely supplied by our makers of agricultural implements.

Mr. F. W. Swinton, of Iowa, who is an authority upon agricultural interests said: "There is only one thing more that the farmers of the West would like the Government to do for them, and that is to have a thorough test of farm machinery." He goes on to say, "only farmers know what a loss of time and money is experienced in not knowing what kind of farm machinery is best adapted to certain soils."

The Agricultural Department is continually pointing to the necessity of maintaining the fertility of the soil and the advantages of better methods of farming. These are of importance, but they should also be enabled to point to the benefits derived from improved farm implements and machinery.

To illustrate: In 1830 it took over three hours of labor to produce 1 bushel of wheat, while now it is estimated to take less than ten minutes; in 1850 the labor represented in 1 bushel of corn was estimated at four and one-half hours, while now it has been reduced to about forty minutes; in 1860 the labor in 1 ton of hay in bales was represented by thirty-five and one-half hours, while now it is reduced to about ten hours. Owing to this improved machinery a farmer in the Dakotas, paying \$2 a day for labor, can deliver wheat across the continent to seaboard at a lower price than the people of India, paying 9 or 10 cents a day.

Our farmers not only support themselves and the 70 per cent of population living in the cities, but raise a surplus to the value of nearly a thousand millions to export. Our agricultural products exceed six thousand millions annually. The implements and machinery used by American farmers is estimated at a thousand million dollars, and they must buy a hundred million dollars' worth a year to keep up their supply. To make an interest on this vast investment it is important that the implements he buys should meet all the requirements for which they are purchased. Efficiency does not entirely depend upon the kind of work, but upon the power required to do the work, simplicity of construction, strength and durability, economy of labor, and adaptability to varying conditions. In order to judge the practical value of machinery it is therefore necessary that it be subjected to a careful, well-arranged and impartial test. The farmer is not in condition to conduct such investigation, and the manufacturer could hardly pass an impartial judgment. The test should therefore be made by competent, disinterested parties.

That there is an immense waste due to the neglect and unskillful handling of farm implements is obvious to anyone familiar with conditions. Nearly half the money now spent for implements and machinery in this country could be saved if the farmers knew just what to buy and how best to care for and operate the machines. Our agricultural colleges are beginning to recognize the importance of giving instruction to their students in the construction, care, and operation of farm implements, but there is very little reliable information on the subject to be obtained by the farmer generally. They write to the Agricultural Department, I am told, but their questions must remain unanswered because the Department is not in position

to make the investigation of the merits of the various implements necessary to giving advice of value.

While this country is the largest manufacturer and user of implements in the world, in the testing of these implements to determine their efficiency and adaptability we have not kept pace with foreign nations. In almost all the European countries farm machinery investigations have been conducted for many years, greatly to the benefit of the agricultural community. As early as 1860 there were conducted in Sweden tests in farm implements in connection with the meetings and fairs of the agricultural societies. Implement experiments were conducted at the agricultural college of Ultuna as early as 1874. Extensive field trials of implements were conducted in connection with the National Agricultural Society in 1886, 1891, and 1896. The Swedish Government contributed 10,000 crowns to each of the last two exhibits and tests. It was found that such trials were not only a benefit to the farmers in choosing their machines, but were of value to the implement manufacturers in that they pointed out defects in construction and weak points in design.

The chief reason for the rapid progress made in Sweden in the manufacture of implements is ascribed to the impetus given through these efficient tests. The Separator Dairy Machinery Co., of Sweden, presented the department of agriculture with a hundred thousand crowns, ten thousand crowns to be spent annually in farm-machinery investigations, and two experiment stations were established. The trials are conducted in the following manner: Invitations are extended to implement manufacturers for the test of a specified group of implements, the committee in charge reserving the right to select the implement from the manufacturer's warehouse, to insure it being such as were regularly sold, the implement dealers, of course, being expected to furnish their implements without cost, as is proposed here. As early as 1869 field exhibits were conducted in Denmark, and in 1871 a committee of the agricultural society was appointed to take charge of the field trials of farm implements. Since 1892 these trials have been conducted annually, the Danish Government contributing five thousand crowns to defray the expense. The Government also contributes medals, in gold and silver and bronze, as rewards for the most successful machines.

Field trials have been conducted periodically in Norway since 1877, under the auspices of the Society for Norway's Welfare, the General Government also giving support. In Germany the farm-machinery investigations have been conducted mainly under the auspices of the German Agricultural Society, organized in 1885, and the implement trials are part of the attractions of the annual meetings of the society. A permanent committee and a salaried secretary arrange the exhibits and look after this department, the manufacturers delivering the machines free of expense, the society paying the expense of trial. Prizes are offered in Germany. The German Emperor gave a special grand prize of a porcelain vase, as well as cash prizes, but no regular Government aid is given. A very great deal of interest is taken in these experiment stations. The agricultural school at Berlin has an efficient department of farm machinery, with probably the largest museum of models in the world.

In Italy the investigations and comparisons of various implements and machines to determine their efficiency for different localities is conducted by the Federation of Agricultural Societies.

The French Government has a machinery trial station near Paris, which is probably the most thoroughly equipped for the scientific study of principles of construction and efficiency of farm implements and machinery of any in the world. They test new machines and inventions having reference to agricultural industry, and give an unbiased report upon their value to French agriculture. So good are the results which have been thus obtained that the practice is being followed in Spain, where a machinery trial station has been established on the same lines.

The minister of commerce and industry in the Netherlands conducts a test station, giving advice to makers as to any modifications or improvements that may be needed in their mechanism in order to increase its utility to Dutch users, etc.

It will thus be noticed that considerable progress has been made in Europe in establishing machine trial stations. It is not proposed in this country, however, to conduct competitive trials between the various makers of machines, or to offer prizes, or publish the names of the makers of machines tested, but there is still a wide field left open of usefulness in an agricultural experiment station under the auspices of the Federal Government in aid of the farmer and implement manufacturer by impartial tests, made particularly from the farmer's standpoint.

For example, our plows are superior in construction to those of other countries, but they are made in several hundred varieties and shapes. No adequate or scientific investigation has ever been conducted to determine which of the shapes of the moldboards are best adapted to different soils, which will produce the best pulverization of the soil at a minimum expenditure of power, what is the mathematically correct shape of the moldboard of a plow, and in what soils can be used to best advantage disk or moldboard plows. The same is true of harrows and cultivators. Tests should be made to settle what form will bring the best results, considering costs, durability, labor, etc.

Seeding and planting implements have been greatly improved in this country, but there is a large field of usefulness in experiments there. It has been proved that the value of corn may be increased 20 per cent by careful planting. Grain drills may be improved to an equal extent. A large share of our most important crop (corn) is being wasted annually for want of proper machinery for saving it. There is need of investigation there. There is also much wheat wasted, millions of dollars being lost in the aggregate. Tests of separators reducing this loss to a minimum would be of immense value.

If impartial information could be furnished farmers as to the type of machinery best suited to their needs millions of dollars could be saved. The Department need not advertise or recommend any particular firm or even mention the name of the manufacturer in its reports. The up-to-date implement maker would benefit also, as he would learn from the Department the needs of different localities. Suggestions made by a noted agricultural expert in Iowa as to the

character of seed corn and the best manner of planting and cultivating is estimated to have added \$10,000,000 to the wealth of that State in a single year. By the same ratio \$100,000,000 might be added to the wealth of the country by pursuing similar methods.

The arid region of the West, comprising about a fourth of our agricultural domain, is being developed by irrigation. New varieties of farm implements will be needed for those lands. Special implements unknown to Eastern manufacturers will be wanted, and unless investigations are conducted to determine the kind required for that section the settlers may be starved out before they will have an opportunity of learning by experience.

The power used on a farm should be a special feature of this experiment station—relative merits of gasoline and steam engines. The use of denaturized alcohol as a substitute has for years been advantageously employed in Germany. It can be made from waste materials of the farm, even sawdust. The rapidly advancing price of gasoline will direct attention to alcohol as a substitute. The farmer has no information as to the actual cost per horsepower developed by gasoline. The experiment station would enlighten him. The subject of power upon the farm is now in a transition period. Formerly all farm work was done by manual or animal power, with an occasional windmill. An immense amount of energy is developed by the wind, which is for the most part wasted. Improvements on windmills might be made suitable for grinding meal, pumping water for irrigation, etc.

I understand that the Department of Agriculture established last summer a farm-machinery investigation bureau in connection with the irrigation and drainage experiment stations, but without an appropriation it will be impossible to carry on the proposed work; and in view of the importance of the subject and the immense value of such investigations, both to the farmers and implement manufacturers, it is urged that you will give the matter careful consideration. The investigations should enable the bureau to advise the farmer of the merits of different classes of agricultural implements, irrespective of the concern making them, and should advise them fully as to the care which should be taken of the tools. Objection has been made to this appropriation on the ground that it might give undue benefit to certain classes; but as much might be said of almost every Congressional appropriation. The primary benefit to be secured from farm-machinery investigation will be felt by the farmer rather than the manufacturer; but the National Association of Agricultural Implement Manufacturers has warmly indorsed the move, believing that only general good would result from an impartial examination.

The purpose of the investigation would not be so much to determine who makes the best, as to thoroughly test the different machines without advertising the product of any one factory, advising the farmer of the merits of different classes of implements, with reference to their adaptability to local conditions, irrespective of the concern by which they are made. The implement dealer would be expected, of course, to furnish the machine for test without charge. The cost of testing would be comparatively slight when compared with the benefit, which, I believe, would be incalculable. Secretary Wilson told me that he most cordially approved the plan, and he

thought that \$10,000 would be a sufficient appropriation for the work, as he had in the employ of the Department men thoroughly qualified to conduct it.

The CHAIRMAN. In the practical operation of that, what would you have the Government do, exactly?

Mr. FARQUHAR. The Government, through its experts—and they have several quite able experts there—would test the different constructions that the implement dealer would send, with reference to the economy and efficiency and what they would accomplish, and also make experiments—

The CHAIRMAN. Where would the Government test them?

Mr. FARQUHAR. They propose to test them on the ground that they have across the river here.

The CHAIRMAN. To give a binder a thorough test, you would have to give it two or three days at least of continuous work. Where could the Government do that?

Mr. FARQUHAR. I presume there would be no difficulty in doing that. The farmers would be glad to have their wheat cut.

The CHAIRMAN. An experimental test around here would not apply to the conditions on the prairies of Illinois and Iowa.

Mr. FARQUHAR. It would be very much the same thing. The expert would expect to travel around and investigate different soils and different things in different directions.

The CHAIRMAN. How would you settle on the best plow on one experimentation?

Mr. FARQUHAR. There is a mathematically perfect form of moldboard for every soil. But there are perfect shapes for a moldboard, and they would settle on the design for the moldboard and would save the farmers a vast amount.

The CHAIRMAN. How would you impart that knowledge to the farmer without advertising the manufacturers?

Mr. FARQUHAR. They could do it by cuts of the machine, and they would have to order that style.

The CHAIRMAN. How would they know how to order it if they did not know where the man who was manufacturing it was?

Mr. FARQUHAR. They would see to that quick enough.

Mr. COCKS. So far as the shape of the moldboard is concerned, what has that to do with the economy of the plow?

Mr. FARQUHAR. It plays an immense part. I have seen a plow requiring 280 pounds to pull it, and in precisely the same soil another that required only 50 pounds to pull it, turning the same width and style of furrow.

Mr. COCKS. The same soil and the same furrow, precisely?

Mr. FARQUHAR. Precisely.

Mr. COCKS. And under the same conditions?

Mr. FARQUHAR. Yes, sir.

The CHAIRMAN. How would you determine what was the best drag for the farmer?

Mr. COCKS. The best harrow?

The CHAIRMAN. Yes; the best harrow.

Mr. FARQUHAR. That would be determined by the amount of dynamic force it required to operate it.

The CHAIRMAN. One kind of plow does good work in one kind of soil and another in another, and I presume that would apply still more to the harrow?

Mr. FARQUHAR. In soft, sticky soil there would be required a different style of harrow.

The CHAIRMAN. Where can you get an expert in those lines except in a practical farmer who has worked with all those different kinds of machines?

Mr. FARQUHAR. This particular man to whom I was introduced had managed several large farms, and also worked with one of the largest machinery manufacturers in the country for five or six years, and has been all through this country and Europe. He seemed to be well posted in this business, and I talked with several who seemed to be very well posted, and they get letters as to the best planters, and so forth, and they can not tell, because they are not posted—only a general idea.

The association just insisted that I should be chairman of this committee, and it was only the other day I found out I would be received by the committee, and I wrote out in a hurried way what I have read to you here. The experiments in France and Germany and other European countries make me think that it would be of great service here, and I was also encouraged by Secretary Wilson saying that he had a department already organized, and it would only require \$10,000, and I thought it would be worth while to test it.

The CHAIRMAN. I think you would open the widest kind of a door with that sort of thing in this country.

Mr. LAFEAN. How did the others accord with it?

Mr. FARQUHAR. The association voted unanimously to cooperate with the Secretary. It was a unanimous vote. They all seemed to favor it.

Mr. FIELD. Does it not strike you that the present method of placing farm instruments and machinery is a right practical way, when the manufacturer sends some one with the machinery to the man, who demonstrates the action of the machinery on the ground?

Mr. FARQUHAR. It is practical; but one who has traveled all over the country and all over the world, like some of these experts of the Department of Agriculture, would have ideas which might be of great advantage in the matter, and of course each manufacturer is wedded to his own particular designs and construction.

Mr. FIELD. There is sharp competition amongst them, and one man prefers one style of implement and another another. A man pays his money and takes his choice.

Mr. FARQUHAR. There is a rapid improvement and a rapid gain.

Mr. FIELD. Has it not been right on that line?

Mr. FARQUHAR. Yes, sir; a rapid gain on that line. It was thought there would be a still more rapid gain by an appropriation to the Agricultural Department and having them join in and assist.

The CHAIRMAN. Suppose the Deering reaper people entered into a contest with the McCormick reaper people—

Mr. FARQUHAR. They are all the same thing now.

The CHAIRMAN. Yes; I am just giving you an example. Suppose they entered into a contest and the Government expert should testify that the Deering machines were no account, what would be the result? After all, you would get the judgment of one man who represents the Government. He says that the Deering machines are no account and the McCormick machines are all right.

Mr. FARQUHAR. When they have the reputation that the Paris Experiment Station has in France, the people would believe them.

The CHAIRMAN. What really would practically be the result of a case like that, such as I have stated? Suppose that happened, and it is very possible that it might happen. I do not see how you could avoid it if you go into this thing and advertise the merits of the machines to the farmers.

Mr. FARQUHAR. Yes, sir; there would be some conflict of opinion and some friction engendered, but the agricultural manufacturers are all ready to take the chances. They think the result would be an improvement. They would get the advantages of all the improvements, and each one would get an advantage by the improvement of all and could improve his implements.

Mr. COCKS. It is not many times a matter of choice simply between two machines. They both do good work and you prefer this one and I prefer that one, for no particular reason, and you could not demonstrate the superiority of either.

The CHAIRMAN. The interesting part of this is that the German Government has undertaken it, and also the French Government, I think you said.

Mr. FARQUHAR. Yes, sir.

The CHAIRMAN. That is rather surprising to me, that they have undertaken it and succeeded.

Mr. FARQUHAR. They have succeeded in improving the implements.

The CHAIRMAN. I do not see how they can, myself. I will not take any expert's opinion on that sort of thing. I would rather try it for myself.

Mr. LORIMER. They might test all the plows in the country that were almost valueless, and they might say, "These plows are no account," and they might say that this other plow was a good plow.

The CHAIRMAN. You will find that there are mighty few plows nowadays that are not pretty good.

Mr. FIELD. You would have to get a man like Doctor Wiley to establish a standard.

The CHAIRMAN. And standardize a machine?

Mr. FIELD. Yes.

The CHAIRMAN. This comes up under Doctor True's office, the Office of Experiment Stations, and we will hear him on it when we have him before us.

(At this point the committee adjourned until to-morrow, Wednesday, February 14, 1906, at 10.30 o'clock a. m.)

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Wednesday, February 14, 1906.

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth (chairman) in the chair.

There appeared before the committee Mr. A. C. True, Director of the Office of Experiment Stations, and Mr. Walter H. Evans, Chief of Insular Stations, of the Office of Experiment Stations of the Agricultural Department.

The CHAIRMAN. Doctor True is before us this morning on the work of the Office of Experiment Stations. This is on page 39 of the estimates.

STATEMENT OF MR. A. C. TRUE, DIRECTOR OF THE OFFICE OF EXPERIMENT STATIONS OF THE DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. The first item under your office is "One editorial assistant, at \$1,800, dropped." What have you to say about that?

Mr. TRUE. When the statutory roll was made up last year this person was included as an editorial assistant, but his duties are not defined by that term. He is one of our scientific workers, and works a part of the time in the field and part of the time here, and there seemed to be no good reason really for including him in the statutory roll any more than any other of our scientific men.

The CHAIRMAN. So that he is dropped from the statutory roll and paid now out of the lump sum?

Mr. TRUE. Yes, sir; he is paid now out of the lump sum.

The CHAIRMAN. We understand that. You have asked for an increase of one clerk at \$840, at the bottom of that same page.

Mr. TRUE. Yes, sir.

The CHAIRMAN. Why do you need that, Doctor?

Mr. TRUE. During the year one clerk has been appointed on the lump-sum roll for irrigation; but necessarily, in making up the roll for the new year that clerk will be transferred to the statutory roll. The person is already employed. It is simply a matter of transferring to the statutory roll for the next fiscal year.

The CHAIRMAN. There is a transfer there from the lump sum of irrigation, really?

Mr. TRUE. Yes, sir.

The CHAIRMAN. Now, on the top of page 40 I see you have a messenger at \$840, a messenger at \$600, a messenger at \$540, a messenger at \$480, and one messenger boy at \$360. What in the world do you do with all those messengers?

Mr. LAMB. Then you have one messenger submitted, I see.

The CHAIRMAN. Yes; one submitted.

Mr. LAMB. Yes.

The CHAIRMAN. Two messengers, as a matter of fact, are submitted. There is one at \$600, and one at \$480. What do you do with those messengers?

Mr. TRUE. Our rooms at the Department are located on three different floors, and then on the second floor we are at both ends of the building. That makes it necessary for us to have more messenger force than we would have otherwise. And of course the scattered condition of the Department buildings also necessitates more messenger force than we would have to have otherwise. We have to deal with all the bureaus of the Department, and that makes an unusual amount of messenger service.

Our messengers, however, are employed not strictly on messenger service altogether, but as far as possible we fill in their time with such things as the writing of franks or the mailing of letters, or any work that they can do to make full service.

The CHAIRMAN. You ask for two new messengers?

Mr. TRUE. Two new messengers have been appointed during the year, one at \$600 and one at \$480, and the proposition now is simply

to transfer them from the lump sum out of which they are paid to the statutory roll.

The CHAIRMAN. What from; irrigation?

Mr. TRUE. Yes, sir. I think they have both been charged, so far, to irrigation.

The CHAIRMAN. Both of those are transferred from the lump sum of irrigation?

Mr. TRUE. Yes, sir; from the lump sum.

The CHAIRMAN. Very well.

Mr. LAMB. Is this \$1,800 assistant here dropped? Is that really a saving? I see by your sum total here that you count it so.

Mr. TRUE. He would be transferred to the lump sum for irrigation.

Mr. LAMB. That makes your expenses of last year and this year about equal?

Mr. TRUE. So far as the statutory roll is concerned.

Mr. LAMB. Yes, sir.

Mr. TRUE. There is one point not mentioned in the estimates to which I would like to call attention. We have on this roll now one messenger boy at \$360. That is \$30 a month. Practically we can not keep efficient help at that price. It means the taking on a boy and keeping him for a little while and then his going out because he gets a better place somewhere else. It would be much better, in my judgment, to change that to \$480—\$40 a month—at which price we could hold the boys much better. And in this case it happens that we have a boy at present who is unusually intelligent and suited to our business and I should hate to lose him, as we are likely to do any day because the amount is so small.

The CHAIRMAN. Who is he, in that \$360 place?

Mr. TRUE. A young boy.

The CHAIRMAN. How old is he?

Mr. TRUE. Sixteen or seventeen.

The CHAIRMAN. Is not that pretty good wages for a boy of that age?

Mr. TRUE. Not as things run in the Departments.

The CHAIRMAN. No; that is true. Not as they run in the Departments. But as they run in ordinary business, a boy of 16 getting \$30 a month with all of his holidays, we would consider it a pretty good place for a boy of that age up in our country. For instance, take this boy here; what is he doing in the line of educating himself? Is he going to night school?

Mr. TRUE. I think he is going to school, and working along. He can not be held in that place very long, and yet, as I say we have not had any boy recently who is better adapted to our work, and we are fitting him in there to do not only messenger service but other things connected with our office work. Now, we can not hold him; I feel confident of that.

The CHAIRMAN. I hope you will not hold him. I hope he will get out of the Government service and get a place where there is some hope of reward.

Mr. TRUE. Of course it was a mere happen-so that that position got on the statutory roll last year at that figure. We have not usually employed messenger boys at that price.

The CHAIRMAN. Now, passing on to your lump-sum appropriation, this reads:

To carry into effect the provisions of the act approved March second, eighteen hundred and eighty-seven, entitled "An Act to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July second, eighteen hundred and sixty-two, and the acts supplementary thereto," and to enforce the execution thereof, eight hundred and thirteen thousand one hundred and twenty (seven hundred and ninety-four thousand, six hundred and sixty) dollars, twenty-four thousand five hundred (twenty-one thousand six hundred and sixty) dollars of which sum shall be payable upon the order of the Secretary of Agriculture, to enable him to carry out the provisions of section three of said act of March second, eighteen hundred and eighty-seven.

Just give the committee a short résumé of that act, and how you are using this money to carry out the provisions of section 3 of this act of March 2, 1887? What are you doing on that line?

Mr. TRUE. Under that head is included what may be called the general business of the Office of Experiment Stations. We constitute a clearing house for the agricultural experiment stations. We inspect the stations to see that they are spending properly the money received under the act of Congress of 1887—the so-called Hatch Act. We receive all the publications of the stations, and on the basis of those publications we prepare both technical and popular publications for distribution throughout the country, the idea being that our office shall in that way help to make whatever is done in any one State by the experiment stations useful to the people of all the States.

There are also stations in some fifty countries of the world carrying on investigations of a character similar to those carried on in the United States. We gather together all the publications of the experiment stations and kindred institutions throughout the world, and on the basis of these publish a monthly journal called the "Experiment Station Record," in which brief résumés are given of investigations made in this country and in other countries. That publication is distributed to the officers of the agricultural colleges and experiment stations, to libraries, to scientific workers who are working along similar lines in this country, and by a system of exchanges also to a considerable number of foreign workers. In that way the Department gets in exchange a very considerable number of valuable publications. The Experiment Station Record is not only useful to workers outside of the Department, but also to our large force of scientists in the District of Columbia, who otherwise would not have suitable means for getting speedy, accurate information regarding what is going on throughout the world on lines on which they are working.

Besides that, we have authority under the law to do whatever will promote the interests of these institutions, and we do that in various ways, consulting with the officers, advising them regarding whom they are seeking to fill appointments, on the subject of work to be done, equipment and buildings suitable to their work, etc. And so in a wide way we form a center of information and aid for these institutions throughout the country. This lump sum is to pay the expenses of the force, traveling, office equipment, and miscellaneous supplies.

The CHAIRMAN. I will say to the committee that out of the large lump sum of \$813,120 is paid the amount to each agricultural experiment station.

Mr. TRUE. There are 48 States and Territories at \$15,000 apiece, making a total of \$720,000.

The CHAIRMAN. The next is:

The Secretary of Agriculture shall prescribe the form of the annual financial statement required by section three of said act of March second, eighteen hundred and eighty-seven.

What is that financial statement that is required under that law?

Mr. TRUE. The Hatch Act requires that each experiment station shall report its receipts and expenditures to the Secretary of Agriculture, and in order to secure uniformity and a proper understanding of their expenditures authority has been given us in the appropriation acts for a considerable number of years to make up a schedule, and that we do. But we follow that up with a personal inspection of the stations, so as to actually know from an examination of their books how the money is spent.

The CHAIRMAN. In regard to this \$15,000 for each State, how do you find it is spent at these stations actually?

Mr. TRUE. That is now quite strictly applied to the purposes of the law. The organization of our experiment stations is quite complex, since they are made departments of the land-grant colleges. In this way a large number of men are employed in both the college and the station, and the equipment of the stations and the colleges is in considerable measure a joint equipment. In this way nice questions arise as to the proper adjustment of salaries and expenses, and we have found it necessary, therefore, to make a close scrutiny of the expenditures and to discuss with the authorities at each station the exact expenditure of this money and its relation to the expenditure for the agricultural colleges.

In recent years, however, the authorities have come to understand the proper distinctions between the work of investigation represented by the experiment stations and the work of instruction represented by the colleges, so that we have less difficulty than formerly in making the proper adjustment of these funds. And yet hardly a year passes in which some adjustment is not necessary.

For instance, a year ago in one State we found that from a change of administration a considerable number of old bills, for which the college had no funds, were by the new administration of the institution put over into the station account. They would have been under some circumstances proper charges against the experiment-station fund, but the accounts for the years against which they would properly run having been settled, it did not seem to us that they ought to be a charge against the experiment-station appropriation for that year.

We insisted, therefore, that they should be taken out, and that the State should in some way provide for them, if they were proper bills to be paid by the experiment station.

That is an illustration of what we do from time to time.

Mr. ADAMS. In these examinations, do you have some one official in the Department whose duty it is to inspect the books of the stations, or do you have people in the different parts of the country who do that work incidentally?

Mr. TRUE. That work has been done by three or four of our chief men in the Office of Experiment Stations, because the visits which we make to the experiment stations are not simple visits of inspection.

In connection with our examination of the accounts we hold conferences with the station officers, and often with the college officers, and discuss with them matters relating to their work, the object being to get as complete a knowledge as we can of the workings of the institutions in the different States, and to aid them through suggestions and advice growing out of our broad experience, as far as we can. It has never seemed to me desirable to trust that work to a single officer who would be simply an inspector. I have thought it was better for our chief men who had a wide acquaintance with the work to make these visits and to become familiar with the workings of the stations in the different States, and so be in a position to give them advice and counsel in the best way.

The CHAIRMAN. Doctor, how much of that \$15,000 is in salaries? About what percentage of it on an average, I mean?

Mr. TRUE. The average runs somewhat over \$8,000—between \$8,000 and \$9,000 a year.

The CHAIRMAN. For each station?

Mr. TRUE. Yes, sir.

Mr. ADAMS. A little below 60 per cent, is it not?

Mr. TRUE. Yes, sir. And yet that is a very difficult thing to determine exactly on a relative basis, for the reason that a great many of these stations have some other funds.

The CHAIRMAN. State funds?

Mr. TRUE. State funds or funds derived from the sale of products, fees for fertilizer analyses and other sources, and in many cases part of the salaries is paid out of those funds. Of course, in our largest stations very much more than the entire Hatch fund is expended for salaries, because some of the stations now have incomes up to \$100,000.

The CHAIRMAN. Give the committee some idea of what the rest of the money is spent for, actually; just in a general way, what kind of bills would be passed?

Mr. TRUE. Outside of salaries?

The CHAIRMAN. Outside of salaries.

Mr. TRUE. There is the labor on the farms and in the greenhouses and in the stables. That is a considerable item. Then there is the expense for scientific apparatus, some of which is quite costly, and all the tools and implements, and all the traveling expenses on station business.

The CHAIRMAN. Under traveling expenses; how do they travel under that appropriation?

Mr. TRUE. It is necessary that they should understand the conditions in different parts of the States, and in some cases to actually carry on experiments there, and it is thought proper that expenses for that purpose should be charged against this fund. We try, however, so far as the Hatch fund is concerned, to limit those expenses so far as our influence is concerned, and we have kept them down within reasonable limits, I think.

Mr. SCOTT. Do you know what fund the expenses of attending farmers' institutes are charged against? It is common for the faculty at these agricultural colleges and experiment stations to attend farmers' institutes, and I would like to know if you can tell us what fund their expenses are charged against?

Mr. TRUE. In some cases those expenses have been charged against the Hatch fund. The position which we have taken in respect to

that matter is that a limited expense for that purpose is a proper charge against that fund, because it is very desirable that station men should get out and meet the farmers to a certain extent, so that they might get an understanding of the real problems as they lay in the minds of practical men, and get suggestions with reference to the lines of work that they should take up. But farmers' institute work should not be a principal part of their business.

So that we have urged that as far as possible the State should add to this fund, if it desired to have the farmers' institutes supported; and more than that, that the station men should not be called upon to do a large amount of farmers' institute work. As soon as we find that a man is giving his attention very largely to that kind of work and neglecting his work of investigation, then we make objection to that.

Mr. HAUGEN. How are they sent out; on their own motion, or on the suggestion of the farmers' institutes?

Mr. TRUE. In some of the States the farmers' institutes are under the control of the agricultural college or experiment station, under State laws. In other States the farmers' institutes are managed by the State department of agriculture or the commissioner of agriculture, and in that case the station men are invited to go.

Mr. HAUGEN. They are invited by whom?

Mr. TRUE. Invited by the State officer, the commissioner of agriculture.

Mr. HAUGEN. Is the farmers' institute a part of the organization of experiment stations?

Mr. TRUE. Not strictly.

Mr. HAUGEN. They are sent out at the invitation of the State officers, you say?

Mr. TRUE. Yes, sir; of the State officers. Now, in Iowa that would not be so. There, there is simply a county organization, or local organization, which manages the institutes.

Mr. HAUGEN. In certain parts of my State they are finding a good deal of fault with the lecturers that are sent out, and they say they ought to send some practical men that could tell them something about farming. They do not seem to appreciate specialists and scientists along certain lines. I wanted to know who was to blame for that.

Mr. TRUE. That may be so in certain cases, but the fact remains that the demands for these men to go to farmers' institutes are far beyond what can be met, and we have to resist the efforts that are made to get them before the farmers' institutes.

Mr. HAUGEN. And I understand from you that the men do not go of their own initiative, but the officer of the State invites them?

Mr. TRUE. In New York State, for example, the farmers' institutes are managed through the State department of agriculture. They have a special superintendent of farmers' institutes. He holds in the State three or four hundred institutes during the year. He is constantly calling on the men at the New York stations to go out and speak in the institutes.

Mr. ADAMS. I would like to interject an illustration of this system, which differs in the different States. In Wisconsin we have a direct appropriation of \$12,000 from the legislature to farmers' institutes, and that organization is put under the control of the board of regents of the university. That is, they have authority to select a superintendent. That superintendent handles the whole business.

Now, the demand from him and from the farmers of the State for experiment-station workers like Professor Henry and Doctor Babcock and Doctor Russell and other specialists is very strong, and it is utterly impossible for those gentlemen to devote the time to that work which they would like to devote, and which the farmers of that State would like to have them to devote. In our State it meets with universal approval, and the agricultural sentiment is very strongly in favor of the institute work and also of the experimental work.

Mr. BOWIE. I think the point Mr. Haugen is getting at is as to whether they are in favor of these scientists coming before them. My experience in my State is that they are in favor of them.

Mr. ADAMS. They are in my State, overwhelmingly. And when we from the State Dairymen's Association send for Doctor Babcock, as we invariably do, if we can get him, we pay his expenses; and in the institute work in our State I think that the expenses come out of the institute funds proper.

Mr. TRUE. That is so.

The CHAIRMAN. Are there any further items of expense charged to that account which you wish to mention—that \$15,000 of national money?

Mr. TRUE. I think that I have covered the ground in a general way.

Mr. FIELD. I want to ask you whether the amount paid out of the Hatch fund for salary is usually supplemental to the salary received from the State governments or whether they use that pay independent of anything else, as the exclusive salary that they rely upon?

Mr. TRUE. That would depend upon circumstances, in this way: The salary budget for the station is made up on the basis of their total expenses, including both the State fund and the Hatch fund. Often the salaries are entirely paid either from the Hatch fund or from the State fund. But in some cases it seems desirable or necessary to fix a salary so that a man will be paid for part of a year from the Hatch fund and for the other part of the year from the State fund.

Mr. ADAMS. To illustrate that, you take Doctor Babcock, and you can see why that is. He does work in the experiment station—practical work in making experiments with cheese. A considerable portion of his time is devoted to that, and also a considerable portion of his time is devoted to instruction in the Department of Agriculture, and so his pay is properly divided.

Mr. FIELD. What I wanted to get at is whether the employees in the colleges receiving a salary from the State would have that increased by an amount from this Hatch fund?

Mr. TRUE. No, sir; I should say not.

The CHAIRMAN. The next is:

And the Secretary of Agriculture is hereby authorized to furnish to such institutions or individuals as may care to buy them copies of the card index of agricultural literature prepared by the office of experiment stations, and charge for the same a price covering the additional expenses involved in the preparation of these copies, and he is hereby authorized to apply the moneys received toward the expense of preparation of the index, and this fund shall be available until used.

Tell us about that. What is the work done under that? How many do you sell, and how much do you receive for them?

Mr. TRUE. That card index is made up on the basis of the publications of the experiment stations, each card containing a title, the name

of the author, and a brief statement of the contents of the publication; and these cards are arranged according to general subjects, such as field crops and horticulture.

A limited free distribution of those cards is made; one set to the agricultural college of each State, one set to the agricultural experiment stations, and one set to the State department of agriculture. Beyond that we have demands from private parties and institutions for these cards; and so an arrangement has been made, as has been stated here, to sell them, and we receive the money, which is turned over to the Treasury, and we have authority to use that money toward the expense of preparing the index. It is a comparatively small matter. Our receipts from this source last year, if I remember correctly, were \$137.

The CHAIRMAN. It is a small item. Now, if there are no other questions the committee want to ask on this line, we will pass on to the experiment stations for Alaska, Hawaii, and Porto Rico. Last year the appropriation was \$48,000 for those three stations, and you now ask \$55,000?

Mr. TRUE. Yes, sir.

The CHAIRMAN. Take them in their order, Alaska first. What do you propose to do there, and why is the additional appropriation necessary? Give us any other information also that you have.

Mr. SCOTT. I understand that Doctor Georgeson, who has had charge of the Alaska station, is here; and in connection with what Doctor True has to say, I am sure we would be interested in his giving a brief summary of what he has done in the last year.

The CHAIRMAN. I will leave that to Doctor True.

Mr. HAUGEN. Before Doctor True gets through I would like to ask him a question or two.

The CHAIRMAN. Along what lines?

Mr. HAUGEN. Simply along the lines of the experiment stations.

The CHAIRMAN. You had better ask him now, before we leave that subject.

Mr. HAUGEN. I would like to know how many of these forty-eight States and Territories receiving this \$40,000 contribute any money toward the support of experiment stations.

Mr. TRUE. Just about half.

Mr. HAUGEN. Have you a list of those?

Mr. TRUE. I could furnish it; I have not got it now.

The CHAIRMAN. Do you mean that only half of the States contribute anything to their experiment stations?

Mr. TRUE. About that.

Mr. HAUGEN. I would like to know how many of the forty-eight States and Territories that receive this \$15,000 a year contribute to maintaining the experiment stations—the stations that we contribute money to under the Hatch fund.

Mr. TRUE. My recollection now is that there are either 27 or 28 States which so contribute.

Mr. ADAMS. There are more than that that make appropriations for experimental purposes.

Mr. TRUE. I am speaking now of direct appropriations to aid the stations. There are a few of the States which have fertilizer laws.

Mr. HAUGEN. What is that?

Mr. TRUE. There are several of the States which have fertilizer

laws, allowing a fee for analyses, and that work is done by the experiment stations, and in a few cases they get a little more money than the analyses cost, and that is devoted to their experimental work.

Mr. BOWIE. They get a good deal more in Alabama.

Mr. TRUE. Yes, sir; in Alabama they get a good deal more in the total, but so far as we can make out most of that money goes to the general purposes of the agricultural college and the farmers' institute work.

The CHAIRMAN. And not to the experiment station?

Mr. TRUE. Only a portion to the experiment station.

Mr. HAUGEN. These are the fees you are referring to now?

Mr. TRUE. Yes, sir.

Mr. HAUGEN. A little more than half of that money from the appropriations?

Mr. TRUE. Yes, sir.

Mr. ADAMS. I suggest that you prepare a statement for the committee, a statement showing the direct appropriations to the stations, and also giving a list of those States which make appropriations for experimental purposes, which appropriations are largely expended through the experiment stations.

Mr. TRUE. Yes, sir.

Mr. BOWIE. In collaboration work?

Mr. HAUGEN. Appropriations strictly applying to these experiments.

Mr. ADAMS. Both that and directly appropriated to the experimental work, which is covered in the same general idea.

Mr. HAUGEN. Can you give the amount appropriated by each of the States?

Mr. TRUE. No, sir; I could not give that, so far as all of them are concerned. This can be said, on the whole, that the money received by the experiment stations from State appropriations, analyses of fertilizers, feeding stuffs, foods, etc., farm receipts and miscellaneous receipts, and they amount this year to more than the receipts from the Hatch fund. So that in the aggregate the stations get about \$1,500,000.

Mr. HENRY. As I understand, a part of that income is appropriated for the agricultural colleges, and really it is of no special benefit to the experiment stations.

Mr. TRUE. I am speaking now of the amounts which, so far as we can make out, are expended for experimental purposes.

Mr. HAUGEN. You mean in all the States?

Mr. TRUE. Yes, sir.

Mr. HAUGEN. A little over a million dollars, including the Hatch fund?

Mr. TRUE. \$1,500,000. Somewhat more than the Hatch fund, in the aggregate. But of course the appropriations in a few States are large, and that brings up the total quickly. For instance, in New York State about \$100,000 were given, mostly to the State station, which receives only \$1,500 of the Hatch fund.

Mr. COCKS. One thousand five hundred dollars?

Mr. TRUE. One thousand five hundred dollars. In New York State the Hatch fund is divided. The station at Cornell University gets \$13,500, and the station at Geneva, established under State authority, gets \$1,500. But the State station gets the larger appro-

priation from the State. In Illinois the State gives \$80,000 or \$90,000 in addition to the Hatch fund.

Mr. COCKS. Then New York makes the largest appropriation of any for this experiment work?

Mr. TRUE. My recollection is that it is still the largest; but Illinois is very close to it. I will here insert the figures you desire.

Revenue of agricultural experiment stations for year ended June 30, 1905.

Station.	Location.	Revenue.			
		Hatch fund.	State.	Other sources, ^a	Total.
Alabama (College).....	Auburn.....	\$15,000.00		\$18,290.70	\$33,290.70
Alabama (Canebrake).....	Uniontown.....		\$2,500.00	610.89	3,110.89
Alabama (Tuskegee).....	Tuskegee Institute.....		1,500.00		1,500.00
Arizona.....	Tucson.....	15,000.00	13,698.86	1,040.41	29,739.27
Arkansas.....	Fayetteville.....	13,168.45		1,567.33	14,735.78
California.....	Berkeley.....	15,000.00			15,000.00
Colorado.....	Fort Collins.....	15,000.00		b 967.75	15,967.75
Connecticut (State).....	New Haven.....	7,500.00	b 15,950.00	b 12,141.02	35,591.02
Connecticut (Storrs).....	Storrs.....	7,500.00	1,800.00	684.31	9,984.31
Delaware.....	Newark.....	15,000.00			15,000.00
Florida.....	Lake City.....	15,000.00		2,183.14	17,183.14
Georgia.....	Experiment.....	15,000.00	637.87	b 4,592.88	20,230.75
Idaho.....	Moscow.....	15,000.00		b 1,450.92	16,450.92
Illinois.....	Urbana.....	15,000.00	85,000.00	b 2,208.10	102,208.10
Indiana.....	Lafayette.....	15,000.00		b 11,880.78	26,880.78
Iowa.....	Ames.....	15,000.00	28,125.00	8,446.82	51,571.82
Kansas.....	Manhattan.....	15,000.00	c 7,650.00	b 4,266.05	26,916.05
Kentucky.....	Lexington.....	15,000.00	b 14,286.00	23,355.07	52,641.07
Louisiana (Sugar).....	New Orleans.....				
Louisiana (State).....	Baton Rouge.....	15,000.00	15,000.00	b 21,592.54	51,592.54
Louisiana (North).....	Calhoun.....				
Maine.....	Orono.....	15,000.00	1,500.00	b 5,569.59	22,069.59
Maryland.....	College Park.....	15,000.00	5,000.00	b 5,599.28	25,599.28
Massachusetts.....	Amherst.....	15,000.00	13,625.00	9,341.65	37,966.65
Michigan.....	Agricultural College.....	15,000.00	c 3,500.00	b 9,220.49	27,720.49
Minnesota.....	St. Anthony Park.....	15,000.00	d 38,749.90	d 8,138.50	61,888.40
Mississippi.....	Agricultural College.....	15,000.00	c 20,000.00	b 5,301.67	40,301.67
Missouri (College).....	Columbia.....	15,000.00	3,000.00	b 10,132.87	28,132.87
Missouri (Fruit).....	Mountain Grove.....		14,050.00		14,050.00
Montana.....	Bozeman.....	15,000.00	6,440.67	4,581.86	26,022.53
Nebraska.....	Lincoln.....	15,000.00	c 15,000.00	b 8,335.45	38,335.45
Nevada.....	Reno.....	15,000.00		b 1,203.71	16,203.71
New Hampshire.....	Durham.....	15,000.00		1,702.83	16,702.83
New Jersey (State).....	New Brunswick.....		e 27,000.00		e 27,000.00
New Jersey (College).....	do.....	15,000.00			15,000.00
New Mexico.....	Agricultural College.....	15,000.00		2,638.43	17,638.43
New York (State).....	Geneva.....	1,500.00	93,753.97		95,253.97
New York (Cornell).....	Ithaca.....	13,500.00	f 10,000.00	210.95	23,710.95
North Carolina.....	Raleigh.....	15,000.00	g 14,000.00	771.35	29,771.35
North Dakota.....	Agricultural College.....	15,000.00	c 5,000.00	b 5,479.86	25,479.86
Ohio.....	Wooster.....	15,000.00	b 52,470.16	b 10,634.51	78,104.67
Oklahoma.....	Stillwater.....	15,000.00	b 1,421.65	b 2,837.98	19,259.63
Oregon.....	Corvallis.....	15,000.00		b 1,516.27	16,516.27
Pennsylvania.....	State College.....	15,000.00	b 1,141.68	17,988.21	34,129.89
Rhode Island.....	Kingston.....	15,000.00		3,738.45	18,738.45
South Carolina.....	Clemson College.....	15,000.00	1,620.83	b 3,596.04	20,216.87
South Dakota.....	Brookings.....	15,000.00	1,000.00	3,140.73	19,140.73
Tennessee.....	Knoxville.....	15,000.00		6,167.99	21,167.99
Texas.....	College Station.....	15,000.00	c 6,000.00	1,612.37	22,612.37
Utah.....	Logan.....	15,000.00		b 1,635.43	16,635.43
Vermont.....	Burlington.....	15,000.00	1,545.72	2,850.24	19,395.96
Virginia.....	Blacksburg.....	15,000.00		55.47	15,055.47
Washington.....	Pullman.....	15,000.00		225.10	15,225.10
West Virginia.....	Morgantown.....	15,000.00		14,773.65	29,773.65
Wisconsin.....	Madison.....	15,000.00	18,500.00	1,975.00	35,475.00
Wyoming.....	Laramie.....	15,000.00		604.30	15,604.30
Total.....		718,163.45	540,467.31	266,858.42	1,525,489.18

^a Including contributions of individuals; fees for analyses of fertilizers, feeding stuffs, etc.; sales of farm products, and receipts from miscellaneous sources.

^b Including balance from previous year.

^c For substations.

^d Including substations.

^e For fiscal year ended October 31, 1905.

^f Estimated amount of State appropriation to agricultural college spent for experimental purposes for fiscal year ended October 1, 1905.

^g Estimated amount of State appropriation to board of agriculture spent for experimental purposes for fiscal year ended December 1, 1905.

Mr. HAUGEN. Who has supervision over these special appropriations for experiments? You are carrying on some experiments in Colorado and in Maine, for instance. Does that come under your department?

The CHAIRMAN. That does not come under this appropriation.

Mr. HAUGEN. How much did we appropriate for that?

Mr. ADAMS. For stock breeding and feeding.

The CHAIRMAN. \$25,000. That is for last year.

Mr. HAUGEN. \$25,000?

The CHAIRMAN. For breeding and feeding experimenting.

Mr. ADAMS. That comes under the Bureau of Animal Industry.

The CHAIRMAN. If those are all the questions on this, we will pass on to Alaska.

Mr. TRUE. I would be very glad to have the committee hear Professor Georgeson in regard to the work that he is doing in Alaska. I might make a brief general statement about the need of funds.

The CHAIRMAN. Suppose you do that, and then let him tell what he is doing there, practically.

Mr. TRUE. The sum appropriated to the stations in Alaska last year was \$18,000, of which \$3,000 is to be spent for the purpose of introducing into Alaska breeds of live stock better adapted to the region than those now existing, in the hope of building up a considerable industry along that line.

Of course that will purchase only a few animals, and there was no provision made for their care or shelter, so that in drawing the estimate for the coming fiscal year we have asked for \$5,000 on this live-stock work with the idea that about \$2,000 of that would be required for the erection of simple buildings for the shelter of animals and for the payment of expenses attending their care.

The CHAIRMAN. What is the character of the buildings in Alaska—the construction of them?

Mr. TRUE. The buildings have been constructed of wood, so far, and most of those we have made have been of the simplest character. In some cases the buildings have been put up by our own agents, and are simply of logs, of the simplest pioneer character. The only building that is really substantial is the one at Sitka, where the headquarters of the station are established, and that is a simple wooden building.

The CHAIRMAN. Is lumber high in Alaska?

Mr. TRUE. I do not understand that it is relatively high.

Mr. ADAMS. There is lots of timber in Alaska.

Mr. TRUE. But wages are high.

The CHAIRMAN. I suppose so.

Mr. SCOTT. The latitude is high.

Mr. TRUE. Yes, sir; the latitude is high. Now, the indications are that Alaska is about to enter on a new period of development. The mining interests are growing all the time, and they are making more definite arrangements to put them on a permanent basis.

Especially efforts are being made now to construct railways and some actual work of construction is going on, and it is in the region where a railroad is now being constructed that we desire especially to carry on these experiments with live stock; because as soon as the railroad comes in there will be opportunity for sale and transportation of live stock, which has not existed hitherto, and I think there

is but little doubt that individuals will come in to make a business of farming, including the raising of live stock.

Mr. BOWIE. What percentage of land is there in Alaska that is really available for agricultural purposes? Have you made any estimate on that? I have seen a statement to the effect that 20 per cent was available. I wanted to know if you had ever considered that.

Mr. TRUE. Well, perhaps that is as fair an estimate as can be made. It is a thing that can not be determined exactly. There are immense regions there.

Mr. BOWIE. There are immense areas there.

Mr. ADAMS. Ten per cent would make as much available land as there is in the State of Wisconsin.

The CHAIRMAN. Have you any data, or is it a mere guess on the part of everybody, so far?

Mr. TRUE. We have not data that cover the entire region, but we have data which relate to a considerable number of regions. Those show that there are many thousands of square miles of land which, so far as can be determined at the present time, give promising outlook for agricultural operations.

The CHAIRMAN. Last year you had an appropriation of \$15,000 for that experiment station, which is the same amount we give to the other experiment stations in the several States, and of that amount \$3,000 was to be used for the purchase of animals.

Mr. TRUE. I beg your pardon, that is not correct. We have during the current fiscal year \$18,000; that is, \$3,000 for the purchase of live stock in addition to the \$15,000.

The CHAIRMAN. Yes; I see that is additional. Three thousand dollars additional. Now, how do you spend that \$15,000? How much of that goes in salaries? What does your salary roll aggregate?

Mr. TRUE. It is a little less than \$8,000.

The CHAIRMAN. Mr. Georgeson is the head, as I understand. How much does he get?

Mr. TRUE. Three thousand dollars.

The CHAIRMAN. What subordinates has he?

Mr. GEORGESON. We have men stationed at several points—at Sitka and at Kenai, and at Rampart, and we had one man in the Copper River region this year.

The CHAIRMAN. Those are what you might call substations?

Mr. GEORGESON. Yes, sir.

Mr. HENRY. You have four stations in all, including the station at Sitka?

Mr. TRUE. Yes, sir.

The CHAIRMAN. Have you built buildings at each one of these stations?

Mr. TRUE. There are no buildings, I think, at Rampart, are there?

Mr. GEORGESON. A log cabin.

Mr. TRUE. At each of those places there is a simple dwelling place for the agent.

The CHAIRMAN. Built by the Government?

Mr. TRUE. Yes, sir; that involves an expenditure of only a few hundred dollars.

The CHAIRMAN. And what are the salaries of those men who are the subordinates of Mr. Georgeson?

Mr. TRUE. Those salaries range from \$1,000 to \$1,800.

Mr. GEORGESON. There is one man in charge of the Copper River Valley experiment station who gets \$1,800 a year.

The CHAIRMAN. And a house to live in?

Mr. GEORGESON. He has built a log house there himself; and laboring men in there get \$125 a month. That is the regular wage.

The CHAIRMAN. And they board themselves?

Mr. GEORGESON. He boards himself, yes, sir. At Rampart the conditions are practically the same, and that man gets \$1,600. At Kenai the man gets \$1,100; and I have an assistant at Sitka who gets \$1,000.

The CHAIRMAN. That comprises the salary roll?

Mr. GEORGESON. Yes, sir.

The CHAIRMAN. What are the other expenses? How is the rest of the money disbursed?

Mr. TRUE. The money is spent for supplies, apparatus, traveling expenses—just the same as at the other stations.

The CHAIRMAN. What is the proportion—how much is spent for traveling expenses? Have you an itemized account of that?

Mr. TRUE. No, sir; I have not. Have you, Doctor?

Mr. GEORGESON. Mr. Chairman, the traveling expenses sometimes are nothing at all. Last year, for instance, they only consisted in the cost of sending one man from Sitka into Rampart, which was between \$150 and \$200, all told. This year when I was called down here—and I was also in the interior of Alaska—traveling expenses will amount to about a thousand dollars.

The CHAIRMAN. Your traveling expenses?

Mr. GEORGESON. Mine and everybody else's, all together.

Mr. BOWIE. I suggest that we might save time if we just hear Doctor Georgeson.

The CHAIRMAN. Doctor True is being heard on the bill, and I have left it entirely in his hands.

Mr. TRUE. I have made the statement I desired to make regarding our new work, which is the live-stock work, and of course Professor Georgeson is very much more familiar than I am with the details of this Alaska work.

STATEMENT OF MR. C. C. GEORGESON, IN CHARGE OF ALASKA INVESTIGATIONS.

Mr. GEORGESON. Not to take up the time of the committee, I will answer questions.

The CHAIRMAN. Tell us what you are doing in Alaska, in your own way. You have introduced some animals, I take it, already?

Mr. GEORGESON. Yes, sir.

Mr. SCOTT. Before you begin, I just want to say this. I am sure we will all be interested. We have heard Doctor Georgeson here before, when he told us what he was trying to do, and now I think we would like to know how far his continued experiments have confirmed the hopes he then had, or otherwise.

Mr. GEORGESON. They have confirmed the hopes and expectations altogether. We have had some disappointments. We can not do everything you can do down here, but we can do a great many things that nobody expected we could do in there.

And right on this point permit me to say that a gentleman stated in my hearing the other day, I think without knowing that I knew anything of the facts, that he had been able to raise the money to build a railway from Seward to Fairbanks, on the basis of the experiments which you authorized to be made in there in agriculture. If it had not been for that, he said, he could never in the world have raised the money.

Mr. SCOTT. How great a distance is that?

Mr. GEORGESON. Four hundred miles.

Mr. BOWIE. What does it cost to build a mile of road, on the average, through that country? It is pretty expensive, is it not?

Mr. GEORGESON. It is expensive; yes, sir.

The CHAIRMAN. The right of way would not cost much?

Mr. BOWIE. No; but the labor would.

Mr. GEORGESON. That I could not answer—a good many thousands.

Mr. HAUGEN. Who is going to build this railroad?

Mr. GEORGESON. It is a company. I do not know, really, who they are. The gentleman who made the statement is Mr. John E. Baine, the organizer and promoter of the company. I would be very glad indeed if anybody would interview him on the conditions in Alaska. He understands the conditions thoroughly.

Mr. FIELD. What was it that caused this encouragement? What have you done?

Mr. GEORGESON. We have matured grains in the Yukon Valley, in latitude 65° 40', and have done that every year since we started.

Mr. FIELD. What kind of grains—wheat?

Mr. GEORGESON. No, sir; winter rye, barley, and oats of many varieties. We have matured some wheat up there, but I think only once did the wheat really amount to much. That is spring wheat. We matured a little winter wheat this past year. Most of it was winter killed, however, for the reason that the snowfall was very light; but winter rye proved a little hardier. We have matured some grain every year at that station. At the Copper Valley Experiment Station in latitude 62° we have matured some grain every year, but not all of it. The fact of it is that I have only just one man there, that is the superintendent; and I wish to say that the superintendents do not go about with their hands in their pockets. They do the actual work. And when they do the work at the salaries they get, they do it at less than a hired man can be had for in those regions. He had just one man. We have only one team of horses and one cow.

Mr. HENRY. Which station is that?

Mr. GEORGESON. The Copper Valley Experiment Station. And because of having but one man and one team the work naturally is slow in the spring. That is, he can not get it all in at once. We found this year, as will be shown in my report to Doctor True—

The CHAIRMAN. After all, those would be the conditions that would surround a new settler. That would be all he would have. So that the experiment in one sense is from a practical point of view.

Mr. GEORGESON. That is true; but the experiments also prove that if the grain is put in early enough it will all mature.

The CHAIRMAN. How extensive an experiment is this?

Mr. GEORGESON. We have 40 acres at Copper River Valley Station.

The CHAIRMAN. How many acres would you put into each crop?

Mr. GEORGESON. We had about 200 plats. It is experimental. It is all in grain. I have made that chiefly a grain experiment station.

Mr. ADAMS. What can you do with fruit and vegetables?

Mr. GEORGESON. That is what I am now trying to find out. I am now propagating, and also purchasing, some of the hardy fruits, chiefly apples.

Mr. ADAMS. Of Russian varieties?

Mr. GEORGESON. No, sir; not Russian. Some Siberian crab apples, and also of the very hardiest varieties, Duchess, Tetofski, Transcendent, and others of the early maturing varieties; those which are early summer apples here and still are hardy. They are the varieties I am propagating, and I am distributing them all over the Territory. I send out notices to people on my mailing list, and ask them if they want any of these, and will promise to care for them, and if so, I will send them a few trees, and they are then to report upon the results. By this method I hope to obtain valuable information as to what can be grown in the line of fruit trees.

Mr. ADAMS. Is it not much more practicable there to raise raspberries and strawberries than the larger fruits?

Mr. GEORGESON. Yes, sir. They are wild there. Raspberries grow wild up to the Arctic Circle. I have never seen better raspberries than there are in Alaska. As to strawberries, we have wild strawberries there, but I find that under cultivation they run to vine and not very much to fruit. I am trying to cross-fertilize these with some of our improved varieties of those fruits. We grow strawberries in some parts of southeastern Alaska, but I have not been successful with them at the stations. They have been winterkilled. The conditions are somewhat harsher than where they are grown successfully. I am trying to cross-fertilize and develop varieties, and that is the line of work we have entered upon now. We are doing that kind of work at the Sitka experiment station chiefly. That is the headquarters and I can overlook it myself there. I consider it is very important that it should be done. At the other stations, in the interior, we have tried to grow grain. At the Kenai station, on the Kenai peninsula, we have tried to raise cattle.

Mr. HAUGEN. How much agricultural land have you along this 400 miles where it is proposed to build the railroad?

Mr. GEORGESON. It would be only a wild guess on my part.

Mr. HAUGEN. Just an estimate?

Mr. GEORGESON. Probably 15,000 square miles.

Mr. HAUGEN. It is just a narrow valley?

Mr. GEORGESON. No, sir; several valleys. The Matanuska Valley is one, and the Shushitna Valley is another.

Mr. HAUGEN. Fifteen thousand square miles?

Mr. GEORGESON. I think so; in that neighborhood.

Mr. HAUGEN. That is fitted for agriculture—for growing grain.

Mr. GEORGESON. Yes, sir.

Mr. HAUGEN. Wheat, oats, and barley?

Mr. GEORGESON. I do not know about the wheat.

Mr. HAUGEN. Is this the agricultural part of the territory?

Mr. GEORGESON. Yes, sir; part of the agricultural belt.

Mr. HAUGEN. Best adapted for agriculture?

Mr. GEORGESON. Yes, sir.

Mr. HENRY. If I recollect correctly, you said at one hearing, perhaps the last, that you believed that any crops grown in Finland, Norway, and Sweden, could be grown in Alaska. Have you had occasion to test that?

Mr. GEORGESON. Yes, sir; I believe so still.

Mr. HENRY. What about the Alaskan islands as stock-raising regions—I mean the peninsula?

Mr. GEORGESON. I think they are well adapted for the purpose. There is no forest in the southwestern portion of Alaska, but there is an abundance of grass.

Mr. HENRY. That grass can be silaged?

Mr. GEORGESON. It can be made into silage, and in favorable seasons hay can be made.

Mr. HENRY. Is there any stock now being grown there?

Mr. GEORGESON. There is a little stock at each considerable settlement. The settlers always have some cattle, and in some cases sheep also.

Mr. HENRY. I think it was understood that they were making an experiment on one of those islands with sheep.

Mr. GEORGESON. Yes, sir.

Mr. HENRY. Do you know where that is?

Mr. GEORGESON. That is on Kadiak Island. The Alaska Commercial Company have kept sheep and cattle there for a long time quite successfully.

Mr. HENRY. Wintered there?

Mr. GEORGESON. Yes, sir.

Mr. COCKS. How cold does it get there?

Mr. GEORGESON. It seldom goes below zero, and seldom down to zero, in fact.

The CHAIRMAN. That is due to the Japanese current?

Mr. GEORGESON. Yes, sir.

Mr. BOWIE. What is the distance from the coast that that moderate climate extends? The farther you get from the coast the colder it is, is it not?

Mr. GEORGESON. Yes, sir. At Sitka we are nearly 150 miles from the mainland, and at Kadiak Island just about the same.

Mr. BOWIE. What is the temperature at Sitka?

Mr. GEORGESON. At Sitka it seldom goes down to zero. This winter we had a cold snap up there, however. Last winter the lowest temperature was 22° above zero.

Mr. SCOTT. The mountains come down almost to the sea, do they not, all along that western coast?

Mr. GEORGESON. Yes, sir.

Mr. SCOTT. So that there is very little agricultural land on the coast?

Mr. GEORGESON. There is no agricultural land, in the proper sense. There is plenty for garden land, and that sort of thing, and in the southwest an abundance for pasture, but there is very little farming land in the coast region.

Mr. SCOTT. But whatever hope there is from an agricultural standpoint in Alaska lies chiefly in the use, the agricultural use, of the lands in the interior beyond the coast range?

Mr. GEORGESON. Yes, sir.

Mr. SCOTT. Have your experiments in the Copper River station, for instance, resulted in bringing in any number of settlers?

Mr. GEORGESON. No, sir; not as yet.

The CHAIRMAN. How many years have you been there now for the Government?

Mr. GEORGESON. It will be eight years next April since I was sent up there first.

The CHAIRMAN. You are not prepared yet to advise any agriculturalists to go up there and undertake agriculture?

Mr. GEORGESON. I would be prepared to advise them as far as the agriculture is concerned, if they settled in the neighborhood of mining camps, where they could have good markets. But the transportation is the difficulty. It is the other economic conditions that are adverse to settlement. As soon as the country is developed and railways are built and wagon roads are built, and more people come in and labor goes down in price, then the conditions will be very favorable.

Mr. SCOTT. Have you had any Finns come into Alaska?

Mr. GEORGESON. No, sir; the Finns mostly go to Canada. They make an inducement for them to go there. There is no inducement whatever for settlers to go to Alaska except the homestead law which was passed in 1903, and I can state that I have knowledge of 280 homesteads that have been located under that law, and probably there are a good many more.

Mr. BOWIE. What is considered a homestead?

Mr. GEORGESON. Three hundred and twenty acres.

Mr. FIELD. Is there much variation in the seasons?

Mr. GEORGESON. The climate varies, as it does here.

Mr. FIELD. And that will always make crops uncertain?

Mr. GEORGESON. To a certain extent.

The CHAIRMAN. What animals do you propose to take up there?

Mr. GEORGESON. I propose, with the approval of the authorities here, to purchase some Galloways and take them up there and from them develop an all-purpose breed that can be used for both milk and beef.

The CHAIRMAN. You will not get much milk out of the Galloways.

Mr. GEORGESON. There are some excellent milkers of that breed.

The CHAIRMAN. I thought they were chiefly a beef breed.

Mr. GEORGESON. They are, chiefly; but there are some good milking families among them.

The CHAIRMAN. Where do you get them?

Mr. GEORGESON. They are in the possession of different breeders, and I am in correspondence with them.

The CHAIRMAN. The milking breed of Galloways, where do you get them?

Mr. GEORGESON. I can not tell yet, because I have not visited the herds. My plan is to go to the herd and pick them out.

The CHAIRMAN. What are the cattle around these islands that you spoke of, where the settlers each of them had some cattle and horses, and so forth?

Mr. GEORGESON. They are cattle that have been brought up from along the coast, from Puget Sound and California—chiefly Jerseys.

The CHAIRMAN. Jerseys?

Mr. GEORGESON. Jersey stock and Jersey grades, and they are very poorly adapted to the conditions there. But I think what we had better do is to introduce a hardy, well-haired breed that can stand the climate.

Mr. HENRY. I think you said in one of the hearings that there had been Russian settlements up in the Copper Valley for a good many years, since the days of the Russian possession?

Mr. GEORGESON. That is on the Kenai Peninsula. The Russians did not settle inside of the mountain range.

Mr. HENRY. What success have they made there?

Mr. GEORGESON. In the first place, they are not strictly Russians. They are chiefly Indians with a little Russian blood, and they are not very economical or very thrifty people.

The CHAIRMAN. This \$3,000 for the purchase of animals that was already available last year; have you expended it?

Mr. GEORGESON. No, sir.

The CHAIRMAN. You have not spent that?

Mr. GEORGESON. No, sir.

Mr. COCKS. What about root crops up there?

Mr. GEORGESON. They can be grown to any extent—that is, turnips and rutabagas.

Mr. COCKS. What about beets?

Mr. GEORGESON. I am not certain about beets. They can be grown some seasons and other seasons not.

Mr. HENRY. How about potatoes?

Mr. GEORGESON. They can be grown everywhere, and very successfully.

Mr. COCKS. Is the season too short for beets, or what is the trouble?

Mr. GEORGESON. The beet requires more heat than the turnip.

The CHAIRMAN. You said the potato would grow?

Mr. GEORGESON. Yes, sir.

The CHAIRMAN. That is a very delicate plant, so far as frost is concerned.

Mr. GEORGESON. That is so, but they seem to succeed there.

The CHAIRMAN. I always thought a beet was a more hardy plant than a potato.

Mr. GEORGESON. In the interior potatoes are sometimes killed by the frost. On the coast they are nearly always successful.

Mr. BOWIE. Is it your idea that the only extent to which you can reasonably expect agricultural development in Alaska is to supply the local demands?

Mr. GEORGESON. That is the first outlook. Whatever may come afterwards no man can tell now.

Mr. BOWIE. You do not see anything in sight that justifies any expectations?

Mr. GEORGESON. Under the present conditions it would not pay to export anything. Transportation is too costly.

Mr. BOWIE. But it can be grown cheaper than it can be imported?

Mr. GEORGESON. It can, certainly; and what is especially important in my view is that it is possible for a man to go in and raise a family and live and feed it on the ground.

The CHAIRMAN. You would not recommend a man to take his family there yet, a farmer seeking for a home, seeking for land, would you?

Mr. GEORGESON. Not ordinarily, Mr. Chairman.

Mr. HENRY. What do you know about the reindeer experiment?

Mr. GEORGESON. I really know very little about it personally. I have looked into it from publications. The reindeer experiment is a success. Congress has given \$25,000 a year for a number of years to purchase and care for reindeer, and I believe they have about 10,000—between 10,000 and 11,000 they estimate they have there.

Mr. HENRY. Are they increasing?

Mr. GEORGESON. Yes, sir. Congress has appropriated something over \$200,000 for the introduction of reindeer alone.

Mr. BOWIE. What do they do with those reindeer, principally?

Mr. GEORGESON. The idea of the introduction of reindeer was that they would help out the natives, the Esquimos especially, in seasons when they were short of food.

The CHAIRMAN. They were to be used for transportation of food supply?

Mr. GEORGESON. They can be used for that if they are trained for it.

Mr. CANDLER. What are they mostly used for now?

Mr. GEORGESON. Chiefly to eat, I believe.

Mr. CANDLER. For food purposes?

Mr. GEORGESON. Yes, sir.

Mr. BOWIE. When the Government spends \$25,000 a year for these reindeer, is it simply to propagate the species?

Mr. GEORGESON. That is all, and to pay expenses connected therewith.

Mr. COCKS. Under what Department is that?

Mr. GEORGESON. The Department of the Interior.

The CHAIRMAN. What crops do you assert now can be raised with any degree of certainty in Alaska?

Mr. GEORGESON. Barley, oats, etc.

The CHAIRMAN. Spring crops?

Mr. GEORGESON. Yes, sir.

Mr. SCOTT. About what yield do you expect?

Mr. GEORGESON. I can not go into the yields. Conditions have been so heretofore that it would not be fair to count on yields; but I believe about the same as we get on ordinary soil here. Our experiments, as I say, have all been on small plats.

The CHAIRMAN. Are these small plats rather favorably located, with southerly exposures, and all that sort of thing?

Mr. GEORGESON. No, sir.

The CHAIRMAN. I mean more favorably located than an average farm would be.

Mr. GEORGESON. No, sir.

The CHAIRMAN. I want to tell you frankly that it was asserted by some of the members who went up there at one time—I do not know where it was—that the location was not a fair test; that it was rather too favorably located.

Mr. GEORGESON. Well, Doctor True knows that we have tried not to select the best places, because we wanted to make it a fair test. In the Copper Valley the location is, in my estimation, a very unfavorable one, because the cold wind comes down the river. It is right on the banks of the river, and it does not face the south, but the east, and the cold winds come down and kill the grain when it would not be killed in other places better protected.

The CHAIRMAN. Is your cold wind there a west wind?

Mr. GEORGESON. No, sir. It comes right down the channel of the river, which happens to be north and south.

The CHAIRMAN. Not from the west, but from the north?

Mr. GEORGESON. From the north.

The CHAIRMAN. Your west winds are the warmish winds, are they not?

Mr. GEORGESON. Yes, on the coast.

Mr. SCOTT. How wide is this valley of the Copper River here where you are experimenting?

Mr. GEORGESON. I think it must be pretty nearly 50 miles—40 or 50 miles wide.

Mr. HENRY. How far from the mouth of the river is it?

Mr. GEORGESON. That is inside. At the mouth of the river it is surrounded and closed in by mountains.

Mr. SCOTT. Is this an open prairie or a forest region?

Mr. GEORGESON. No, sir; it is not a prairie. We can not describe it as a river bottom. It is a vast stretch of undulating country, bounded by mountains on each side. It may be even quite hilly and practically a different country in each valley.

Mr. SCOTT. Is it wooded?

Mr. GEORGESON. Yes, sir.

Mr. SCOTT. Do you have to clear away the timber?

Mr. GEORGESON. Yes, sir; we have to clear away wherever we go.

Mr. COCKS. Is that timber valuable?

Mr. GEORGESON. Yes, sir; it is valuable, inasmuch as lumber is very costly in there. In the interior the ordinary price for lumber at the sawmill is \$100 a thousand feet, and from that up.

Mr. SCOTT. What kind of timber is or was growing there?

Mr. GEORGESON. Spruce, and a little cottonwood, and in places some birch.

Mr. SCOTT. Have you enough to make lumbering profitable, if you had facilities for it?

Mr. GEORGESON. Yes, sir. In many cases the logs will be 20 inches in diameter—15 to 20 inches. That is rather extreme. Twelve to fifteen inches will be more like the average of saw logs as they are used.

Mr. BOWIE. What is your idea as to the amount of available land for agricultural purposes in Alaska? I just mean if you have made any compilation of them—thought the question out.

Mr. GEORGESON. I have tried to study that out as best I could. The Territory has not been surveyed, so that we have no accurate data. We can simply estimate by valleys, and I have estimated that there would be about one-sixth of the Territory available for agriculture and grazing, which would be in round numbers nearly 100,000 square miles. That is my estimate.

Mr. BOWIE. Equal to two States the size of Alabama?

Mr. GEORGESON. Yes, sir; just about.

Mr. COCKS. What kind of grass is there; is it practically similar to the western prairie grasses?

Mr. GEORGESON. Yes, sir. Doctor Evans, who is here, can answer that question better. He has been in there to investigate that. He is a botanist. We have several species, and all nutritious grasses.

Mr. COCKS. They are not injured by the frost?

Mr. GEORGESON. No sir; they are native grasses.

Mr. BOWIE. Is the population of Alaska increasing with any special rapidity?

Mr. GEORGESON. Yes, sir; it is increasing. I can not say how fast, because I have no data on that subject and I do not suppose anybody has; but the people who go in there now go in chiefly for the purpose of mining and trading, and as new discoveries are constantly being made the people continue to come in.

Mr. BOWIE. Therefore the demand for food products is on the increase?

Mr. GEORGESON. Certainly.

Mr. BOWIE. What proportion of food products is supplied by home production, and what proportion by imports?

Mr. GEORGESON. We have no data as to how much is supplied by home production.

Mr. BOWIE. You have that as to the imports, of course, of the products?

Mr. GEORGESON. Yes, sir; the imports of agricultural products last year were a little over \$3,000,000.

Mr. BOWIE. They have a system in every State, I know, of estimating the annual food products.

Mr. GEORGESON. Yes, sir; but we have not come to that in Alaska.

Mr. BOWIE. You have not gotten to that Alaska, as yet?

Mr. GEORGESON. No, sir.

Mr. BOWIE. You make no estimate?

Mr. GEORGESON. No, sir.

Mr. BOWIE. What is your idea about it, from the general knowledge that you have?

Mr. GEORGESON. Well, so far it consists chiefly in supplying the people with green vegetables and some milk. No butter, I believe, is made there. We have made butter at the Kenai Experiment Station, but I do not believe it has been made anywhere else. So that we can practically say that the garden vegetables constitute all the food supply that anybody gets out of Alaska. There are no grain farms, except these experiment stations.

The CHAIRMAN. You have not induced any people up there to raise grain as yet?

Mr. GEORGESON. No, sir; we have made no effort to induce settlers to come there.

The CHAIRMAN. When you found that barley and oats were successful, why have you not?

Mr. GEORGESON. Mr. Chairman, we consider that the work assigned to us up there is to ascertain what the country is good for, and then to leave it to the people to do as they please.

The CHAIRMAN. I agree with you on that point. We have in many cases tried to lead the horse to the trough and make him drink, and we can not do that.

Mr. GEORGESON. I get a great many inquiries. People want me to recommend certain localities, but I never do. I will not take the responsibility.

The CHAIRMAN. That is why I asked you the question whether, after the eight years of experimenting up there, you were ready to say to the farmer, "Come here; you can make a home here."

Mr. GEORGESON. I do not consider that is my province, Mr. Chairman, to do that.

The CHAIRMAN. That is the purpose of the Government in making experiments there. They want to decide that question. I suppose that is it. If it is for scientific purposes alone, and not for practical purposes, if these experiments are not for that purpose, what are they to be used for?

Mr. GEORGESON. They are to be used for that purpose, I suppose; but I am not to make recommendations.

Mr. BOWIE. You give them the information?

Mr. GEORGESON. Yes; and let the people draw their own conclusions.

The CHAIRMAN. You make your recommendation in your report to the Secretary of Agriculture, perhaps, and he might make the recommendation?

Mr. GEORGESON. Yes, sir.

Mr. TRIMBLE. Are there any mineral resources where a man could combine mining with agriculture in close proximity?

Mr. GEORGESON. I know of one case, up at Sunrise, where a miner grows a garden on top of the ground and mines for gold underneath.

STATEMENT OF MR. A. C. TRUE—Continued.

Mr. TRUE. I would like to say just a word about this Alaska matter, if I may, before you close. One very important feature of that Alaska work, which Mr. Georgeson has just touched upon, relates to the experiments with reference to the growing of vegetables.

People are going in there to mine, and in a great many cases they are in great need of green vegetables. To show them what vegetables can best be grown has been relatively the principal feature of our work thus far. Now we are prepared to tell people along that line, and we have recently issued a bulletin on vegetable growing in Alaska, as the result of our work. That shows what varieties of vegetables are adapted especially to different regions, and I am sure that that work alone has been of great benefit to the country. We make a distribution of seeds in Alaska as we do elsewhere in the United States, seeking to adapt the varieties to the needs of the people, and the testimony that has come from a good many people shows that we have succeeded in giving them varieties much better adapted to the region than they had before, and that we have helped many a man up there to live a more comfortable life because of the vegetable growing, which we have aided him in doing.

Mr. BOWIE. It is practically impossible to import these green vegetables?

Mr. TRUE. Yes, sir.

Mr. BOWIE. They have to be grown there?

Mr. TRUE. Yes, sir.

Mr. BOWIE. Or else they have to live without them?

Mr. TRUE. Yes, sir; and they are obliged to have them, or scurvy will come.

Mr. BOWIE. Yes. So that that work is an absolute necessity?

Mr. TRUE. Yes, sir.

Mr. BOWIE. But this other work is anticipating the demand that will arise as the population increases?

Mr. TRUE. Yes; and to prevent costly mistakes, to prevent people going in there unadvisedly.

Mr. BOWIE. What proportion of these homestead people are devoting themselves to agriculture?

The CHAIRMAN. That was in Canada, as I understood.

Mr. BOWIE. I understood one of you to state that we have a homestead law there allowing 320 acres, and that a good deal had been taken up in Alaska under that law.

Mr. TRUE. Yes, sir. There has been only a comparatively small business done along that line. Thus far only a few people have engaged in agriculture to any great extent. The growing of crops up there has been principally the growing of vegetables in small gardens.

The CHAIRMAN. Vegetable patches, as Professor Georgeson said.

Mr. BOWIE. Doctor Georgeson, did you not give some figures as to the homesteads that have been entered there?

Mr. GEORGESON. Yes, sir. I said I knew of 280.

Mr. BOWIE. Two hundred and eighty?

Mr. GEORGESON. Yes, sir; that I have knowledge of.

The CHAIRMAN. In Alaska or British Columbia?

Mr. GEORGESON. No, sir; in Alaska.

The CHAIRMAN. I understood you to say that they were Finns who had opened up homesteads in Canada.

Mr. GEORGESON. No, sir; these 280 homesteads I speak of are in Alaska under this homestead law.

Mr. BOWIE. That is, there are 280 that you know of?

Mr. GEORGESON. Yes, sir; that I know of. There are a good many more, undoubtedly.

Mr. BOWIE. To what extent do those people apply the general agricultural knowledge that you get?

Mr. GEORGESON. Presumably all of them.

Mr. BOWIE. But what information have you on the subject other than just an inference?

Mr. GEORGESON. This is a new thing. They have just begun it in the last year. I do not know.

The CHAIRMAN. You do not know whether they are actually living on those claims under the homestead act?

Mr. GEORGESON. They will have to live on them in order to hold them.

The CHAIRMAN. You do not know whether that is really done?

Mr. GEORGESON. No, sir; but they are trying to hold them.

The CHAIRMAN. Is there anything further?

Mr. TRUE. No, sir. Doctor Evans has charge, in the Office of Experiment Stations, of all the business relating to the outside stations. In connection with that work he has during the past year made a personal inspection of the Hawaii station. Now we are asking there for a special appropriation in order to provide a water supply for the use of the station, and I thought Doctor Evans could explain just the situation from personal observation, as to the necessity for that, and any other matters that the committee might like to ask him.

STATEMENT OF MR. WALTER H. EVANS.

Mr. EVANS. Mr. Chairman; the principal item that Doctor True thought that I had better speak of is the increase asked for the Hawaiian experiment station, to provide for a water supply for the station. Our experiment station in Hawaii is located upon the side of a very narrow valley, and the ground which was given us by the insular authorities ranges from 50 feet to 1,900 feet above sea level.

The CHAIRMAN. How many acres have you?

Mr. EVANS. Altogether about 235 acres. That is stretched out one and three-quarter miles long, so that in places the station grounds are not more than 300 yards wide, and the only space for operations is the upper portion, where there is abundant rainfall, and the lower portion, where there is less than 30 inches rainfall. In a tropical country there is no crop you can grow on a 30-inch rainfall. At the upper end—up on the mountain—there is a fall of 120 inches.

This valley runs back from Honolulu to the mountain which is known as Tantalus. We are on the western side of this valley, and it slopes in places very gradually and in other places very abruptly from 1,900 feet to 50 feet elevation. The principal part of the station grounds we are trying to develop is that adjoining the city of Honolulu, where the elevation is about 100 feet. We have 20 acres there that we could use if we had a water supply. At present the city of Honolulu has extended the pipe, or rather we have extended it, having been given the privilege, so that we can use about 4 acres of this lower portion of the station. The rest of it is practically unavailable unless we have a better water supply. The city supply of Honolulu is liable, in the various vicissitudes of water supplies, to fail, and a year ago it was cut off for three weeks from the station entirely. We are liable to suffer from that same thing again, in case of drought. They had an unprecedented drought there last winter, and we were cut off from any water for about three weeks, resulting in practically losing everything that we had in the lower part of the station.

On the upper part of the station, where we could carry on experiments without irrigation, is an abundant rainfall, but it is so far removed from the city and the elevation is so great that certain things that we want to experiment with will not grow.

Mr. ADAMS. How much available land have you in this station?

Mr. EVANS. About 20 acres of the lower portion is available for the ordinary agricultural operations as understood in Hawaii and probably 10 acres on the upper portion could be used. The rest of it is a mountain side that is of volcanic material, lava disintegrated to some extent, which is covered partly with forest, the rest with brush.

Mr. ADAMS. What are the principal problems they are trying to work out there?

Mr. EVANS. The principal problem on the Hawaiian station is to develop something in addition to the sugar industry. The sugar industry has developed to a marvelous extent in Hawaii, but there are a great many other problems that we believe can be developed, and it is our mission to try it. For example, this last year we are carrying on some experiments—

The CHAIRMAN. Who is in charge of that station?

Mr. EVANS. J. G. Smith, formerly of this Department, transferred to the experiment station of Hawaii. We carried on some experiments with tobacco. They have thought heretofore that tobacco was a crop which could not be grown in Hawaii. The success this year was much beyond our expectations, and the experiment was carried on on only about 2 acres all told, devoted to probably 100 different varieties; but some of them proved exceptionally good, and a tobacco man from Seattle, who happened to be in Honolulu at the time this tobacco was fermented and ready for packing, offered his assistance in grading it and then in quoting prices on it.

He priced it at all the way from \$1.50 up to \$4.50 a pound on wrapper tobaccos. That was the second year that we have carried on that experiment, and it begins to appear that something can be done in that way.

The CHAIRMAN. Is there much of that tobacco land in there?

Mr. EVANS. There is probably a good deal of land in the island of Hawaii adapted to tobacco.

Mr. HENRY. It has been said on the floor of the House this year that tobacco would not grow within 20 miles of the seacoast. How far are you from the seacoast?

Mr. EVANS. This particular 2 acres that is being grown in tobacco is within a few miles of the seacoast.

Mr. HENRY. You have grown tobacco that has sold for \$4 a pound on that land?

Mr. EVANS. I said that an experienced tobacco man of Seattle has quoted a price of \$4 a pound on it. That was a Sumatra tobacco—a wrapper tobacco. This experiment has made a decided impression in Hawaii, and the sugar planters in their annual meeting last December appointed a committee to investigate the thing and to consider the advisability of taking up to some extent the growing of tobacco on some of their lands where they can not grow sugar cane. Some of the lands can not grow sugar. They are at elevations of 800 to 1,000 feet, and in some cases 1,800 feet. There is a large amount of land with which nothing is being done beyond the sugar lands.

Mr. ADAMS. About the tobacco, do you gentlemen believe that there is a large area in the islands adapted to tobacco growing?

Mr. EVANS. There has not been an agricultural survey made of that country, but it is believed that there are here and there tobacco lands. These are in places sheltered from the sea, and there are believed to be quite extensive tracts of that character scattered through the islands in different places—probably on the islands of Maui and Hawaii.

Mr. ADAMS. Was there any tobacco grown there before it became a part of our territory?

Mr. EVANS. Tobacco has long been grown there, and it grows well, but it is a very vile product.

The CHAIRMAN. Where do you propose to get this water supply you speak of?

Mr. EVANS. There have been prepared by Mr. Smith and myself a number of plans which contemplate the impounding of the water on the upper part of the station and carrying it to the lower parts.

That will give us not only water for irrigation purposes, but afford fire protection, which we need, because our buildings there are entirely

without protection from fire now—frame buildings—so far away from Honolulu that the city of Honolulu could not reach them with a hose. By impounding the abundant rainfall and bringing it down it would supplement the supply we get from the city water service and give us fire protection. In the estimates we ask for \$5,000, and there have been a number of plans prepared that will come within that sum, as well as others which were suggested by examples of a number of very successful irrigation schemes in Hawaii, but which we believe are outside of any possibility—namely, the digging of artesian wells and pumping water and purchasing some springs in another valley. The whole of Honolulu and the adjacent part of Oahu is underlain with a large artesian basin, and the larger plantations have gone down to this water and pumped it. It will rise to about 20 feet above sea level, and then you have to pump it the rest of the way.

The CHAIRMAN. How deep do you have to go to get the water?

Mr. EVANS. I do not believe I have those figures here.

The CHAIRMAN. Is it a coral rock?

Mr. EVANS. Yes, sir. There is a coral reef lying about a mile and a half outside of Honolulu which they claim acts as a dam to prevent the water from getting away. There are hardly any running streams except after a hard rain, and then there is not much flow. The water percolates through the porous rock down to the reservoir, and the coral reef prevents the water getting out. By digging down, I think about 600 feet, although it may be less than that, you can get that water. It is estimated that we could easily for \$5,000 provide the wells, but the establishment of a pumping plant and the maintenance of it would be almost too much of an item of expense. Our plan is rather to store the storm water on the upper part of the station grounds, where there is usually an abundant rainfall. On the upper end of the station it rained every day this year, whereas on the lower part it only rained once.

The CHAIRMAN. In actual distance, how far is it?

Mr. EVANS. It is less than 2 miles. In a straight line it is probably a mile and a half, but the way the road winds around it is 3 miles. The difference in elevation is about 1,700 feet.

The CHAIRMAN. One part is almost arid, and on the other has plenty of precipitation?

Mr. EVANS. The upper part is a perfect tropical jungle. You can hardly force your way through the undergrowth. Below, with the exception of the prickly pear, lantana, etc., that were on this place that had to be cleared, I think there is practically nothing that grows. I find that it is thought that in case of an artesian-well system an 8-inch well would probably furnish as much water as we need, but the pumping plant would cost about \$12,000, and it would cost about \$1,800 to \$2,000 a year for maintenance.

The CHAIRMAN. Could you not rely on windmills?

Mr. EVANS. I hardly think so, to lift a 6-inch column of water to a height of 100 feet. I do not believe you could do it with a windmill. The water rises only about 20 feet above sea level. In the city of Honolulu there are quite a number of flowing wells, but they are almost on sea level. On the plantations they have centrifugal pumps. For instance, on the Ewa plantation they have a pumping plant that

cost a million dollars, and they can pump 65,000,000 gallons of water a day from this station, irrigating 7,500 acres of cane.

The CHAIRMAN. Your plan would be to make a reservoir and bring the water down in pipes?

Mr. EVANS. That is the plan—to have either a reservoir or a number of tanks. In Hawaii generally they have a great many water tanks constructed, and with the galvanized-iron roofs of their buildings they collect this water into the tanks and pipe it for use. There are a number of these all over the islands. The question is which one of these systems would be probably the most practicable and which the cheapest. In any case it would cost us \$5,000.

The CHAIRMAN. With a reservoir it would have to be cemented?

Mr. EVANS. Probably so; and then, as you know, Hawaii has more or less earthquakes, and they would probably play havoc with a cemented basin.

The CHAIRMAN. Have you any frost?

Mr. EVANS. No, sir. As a matter of fact the water pipes we have there now are on the surface. But the main objection to the reservoir system is that it would have to be cemented, and the cement would have to be shipped there, and then the earthquakes might crack it. Earthquakes are slight, of course, but I believe they are rather common.

The CHAIRMAN. Can you tell us anything more? What are you working on besides tobacco?

Mr. EVANS. We are just now getting at an investigation of citrus fruits. It was a very peculiar thing to me that going into a tropical region I should find that so much of the fruit was shipped from California. You will not find any, or very little, native-grown citrus fruit in any of the markets in the city of Honolulu.

The CHAIRMAN. It is just like the one-crop country in the South.

Mr. EVANS. It is a one-crop country. We have attempted in a way to develop the coffee also. Excellent coffee is grown in Hawaii, and we have undertaken in various ways to help develop that industry.

The CHAIRMAN. You say they can grow it?

Mr. EVANS. They do grow a very excellent coffee. It is little known in this part of the country, but it is marketed on the Pacific coast mostly.

The CHAIRMAN. They raise enough to export?

Mr. EVANS. They used to, and still do export considerable. The element of labor in connection with the coffee business is a serious one.

Mr. BOWIE. Do you know any place in the world where the labor question is not a serious question?

Mr. EVANS. The sugar men are making such a demand on the labor market, which is rather restricted in Hawaii, that there is not much of an opportunity to develop the coffee business, but they have exported quite extensively, and are still exporting from the island of Hawaii. In Hamakua and Kona they produce a great deal of coffee, and they are known for the fine coffee they produce.

Mr. BOWIE. These sugar districts are in American hands?

Mr. EVANS. Unfortunately I believe they are not.

Mr. BOWIE. They are not?

Mr. EVANS. No, sir; they are said to be in English and German hands very largely. That is the information that was given me in

Honolulu. Many of the business managers in Honolulu, a number of whom I met, are either German or English. A great deal of the stock I was told is owned in Germany and England.

The CHAIRMAN. Are there any small landowners in Hawaii?

Mr. EVANS. Comparatively few. There is an attempt being made now, as perhaps you know, to divide up some of the public land that was held under lease from the old government. It was leased for a number of years, and as those leases terminate, the present government is trying to divide those lands up into small holdings, so that they can get small holders to take them rather than lease them to the larger holders.

The CHAIRMAN. Who would be the holders if the land was divided up into small holdings?

Mr. EVANS. An effort is being made to induce more Americans to come down there, and they would be the natural individuals, I think, to take this up. There have been a number of successful colonies of Americans down there. There is one devoted very largely to the raising of pineapples, and it is made up of a number of Americans who have pooled their interests and established a cannery, and in addition to that they are at a sufficient elevation above sea level for the growing of vegetables and fruits, and they are marketing them in the city of Honolulu. That colony is established in the island of Oahu.

The CHAIRMAN. Is the labor on these sugar plantations entirely cooly labor?

Mr. EVANS. It is very largely Chinese, Korean, and Japanese. Probably 99 per cent of it is cooly. There are some Portuguese, but they are largely abandoning the plantations; or they get beyond the manual labor and become foremen or sub-bosses, and things of that kind.

Mr. COCKS. Do not any of the native Hawaiians work?

Mr. EVANS. The native Hawaiian, according to the reports given me in Hawaii and my own observation, is proverbially a lazy individual. He is a fine-looking individual—a great, big, strapping fellow, but the Hawaiians are not very much disposed to exertion. The Portuguese that were taken there some years ago are very industrious, and an attempt is now being made to get more of them, either from Portugal or the Azores.

The CHAIRMAN. They preserve their energy?

Mr. EVANS. Yes, sir; they seem to. Then take this colony of Americans on the island of Oahu—the whole thing is run by the Americans.

The CHAIRMAN. How large is that colony?

Mr. EVANS. I could not state. There are possibly 30 or 40 families.

The CHAIRMAN. Do you know where they came from?

Mr. EVANS. Mostly from California.

Mr. COCKS. Would not that country be suited to Italians?

Mr. EVANS. If you could get the right kind of Italians. According to the newspaper reports and the report of Mr. Atkinson they are trying to get the Portuguese from the Azores and from Portugal in place of the cooly labor.

The CHAIRMAN. What grains can you raise there?

Mr. EVANS. It depends altogether on the elevation. They used to export wheat to California in the early days. They grow corn there.

The CHAIRMAN. Do they raise now what they need for animal and horse feed?

Mr. EVANS. No, sir; that is one thing about Hawaii, it is a one-crop country. They ship their sugar and bring back feed. The concentrated horse feed is mostly rolled barley that comes from California. A number of grasses grow well, and alfalfa does splendidly, and we are trying to introduce, and are introducing, other things to supplement the range.

Mr. H. P. Baldwin, one of the largest owners on the island of Maui, thinks that the efforts of the experiment station in getting new grasses and forage plants has been of inestimable value, far beyond anything that it cost the Government, in helping them out.

The CHAIRMAN. They have introduced a number of things?

Mr. EVANS. Yes, sir; they have introduced a number of economic plants. They found quite a number of grasses that had never been grown there that are now growing successfully.

Mr. FIELD. All that sugar country depends upon irrigation?

Mr. EVANS. Probably 75 per cent of the sugar is grown under irrigation. There is some grown without irrigation, but I would say, roughly, speaking from statements I have had, 75 per cent is grown under irrigation. Down there they say that irrigation and agriculture mean the same thing. Without irrigation you can not have agriculture.

The CHAIRMAN. What was this piece of ground given the experiment station used for before it was given to them?

Mr. EVANS. From photographs which I have seen of the original state of the thing, and the ground as it was when I was over it this last summer, it was a jungle; nothing but a waste. The upper part had been forested. It was burned over and had been replanted by the Hawaiian government thirteen or fourteen years ago. The lower part had been denuded, and had grown up in thorns and scrubby woods and prickly pear. It cost us about \$30 an acre to clear it when we started.

The CHAIRMAN. It was something of a white elephant?

Mr. EVANS. They do not appreciate it that way. They look upon it as worth \$90,000. But it must have been for town lots, if there was any such value as that on it.

Mr. SCOTT. What is the value of that land?

Mr. EVANS. It depends altogether on where it is.

Mr. SCOTT. Sugar land?

Mr. EVANS. Depending altogether on the cost of irrigating it, it will run from \$200 to \$500 or more an acre.

Mr. SCOTT. What are the means of transportation from the interior to the seacoast?

Mr. EVANS. Wagon roads and small railroads. Most of the plantations are along the coast.

Mr. SCOTT. So that they can load right on the boats?

Mr. EVANS. No, sir. There are very few harbors, and they have to carry their stuff to some place where there is a good harbor. On the island of Hawaii the principal harbor is Hilo, and on the island of Oahu the principal harbor is Honolulu.

Mr. SCOTT. Is Honolulu a good harbor?

Mr. EVANS. No, sir; I think not. But Pearl Harbor, only about 8 miles from Honolulu, is said to be one of the finest harbors on the Pacific.

Mr. HENRY. The entrance of Pearl Harbor is blocked, is it not?

Mr. EVANS. Yes; that will have to have a great deal of money spent on it.

Mr. LAMB. That is blocked so that large ships can not enter Pearl Harbor?

Mr. EVANS. No, sir; they can not, on account of a reef. But when they do get inside of it, it branches out into a number of arms, and it is a beautiful piece of water, almost completely surrounded with mountains, with this rather narrow opening to the sea.

The CHAIRMAN. Is the experiment station doing anything in the way of introducing new farm stock there?

Mr. EVANS. We have not undertaken anything in the way of live stock. Our expenses have been quite large heretofore. The Hawaiian government has been proverbially poor, and has not assisted us to any great extent.

The CHAIRMAN. How much have they given you?

Mr. EVANS. They have not directly given us anything for the last two years for current expenses. They should have given us enough to put up some buildings and to help clear that land. They did at the first session of the legislature, after we started there, give us some appropriation for carrying on some experimental investigations, as well as for improvements.

The CHAIRMAN. How much?

Mr. EVANS. In the aggregate, about \$7,600; but part of that they stipulated should be applied to the construction of a fireproof building, and we found that it could not be finished for the amount specified and we had to spend a good deal more in building it.

The CHAIRMAN. What is that?

Mr. EVANS. It is a cement building.

The CHAIRMAN. What do the salaries amount to there?

Mr. EVANS. About \$8,000.

The CHAIRMAN. Just detail them.

Mr. EVANS. The director, Mr. Smith, gets \$3,000.

The CHAIRMAN. Does he have a house to live in also.

Mr. EVANS. He has a house. The entomologist and the chemist each get \$2,000, and the horticulturist gets \$1,500. In addition to that, we have laborers who get an average of a dollar a day.

Mr. BOWIE. There is a great difference between the price of labor in Hawaii and the price of labor in Alaska?

Mr. EVANS. There is a great difference. The rest of this money has gone heretofore into clearing, which was absolutely necessary, and the general laboratory and library systems that we had to supply. In addition, we had our experiments on the other islands going on, and that requires quite a little travel from time to time, probably half a dozen trips a year on the part of two or three of the members of the staff.

Mr. COCKS. Do they produce beef enough for their consumption over there?

Mr. EVANS. There are about 25,000 cattle on the island of Hawaii alone.

The CHAIRMAN. What is the character of the farm live stock?

Mr. EVANS. They have introduced a great many Herefords, and the characteristic markings of the Herefords are on many of the cattle you see, with the exception of dairy cattle, around Honolulu. There is a large dairy where they have many Jerseys and Guernseys, that class of cattle being the prevailing types. But for beef cattle, the Herefords are the type.

The CHAIRMAN. Do they thrive?

Mr. EVANS. They do exceedingly well. They are mostly grazed at elevations of 1,800 feet. On the island of Hawaii you can get an elevation up to 14,000 feet. There is a great deal of beef shipped there in cold storage from San Francisco. They ship all sorts of supplies that way. They get a very cheap return rate. In fact, the rate from San Francisco on perishable supplies to Honolulu is probably less than it is from one of the other islands to Honolulu.

The CHAIRMAN. Are there any sheep there?

Mr. EVANS. On the island of Molokai I believe there are a considerable number of sheep. They are kept at the upper elevations.

The CHAIRMAN. Is it not too wet for them at that elevation?

Mr. EVANS. Not at certain seasons of the year. They take them on the dry side of the island. There is a very distinct season from the wet side, and they can move them about so that rain does not interfere—

The CHAIRMAN. I suppose they have plenty of hogs?

Mr. EVANS. I did not see them. I suppose they have, on the stock ranges.

Mr. TRIMBLE. What sort of work stock have they?

Mr. EVANS. Mules, to a very great extent.

Mr. TRIMBLE. Do they raise them or import them?

Mr. EVANS. They are very largely imported. They raise some, but usually they are shipped there. The largest plantation that I visited does not depend on animals to any extent at all. The work is all done by steam. They plow by steam and they have a portable railroad that does the hauling. A number of the other plantations are the same way.

Mr. COCKS. Do they cultivate the crop by steam?

Mr. EVANS. Sugar is not cultivated to any great extent. They plow the land deeply and put in the crop and irrigate it, and then comes the stripping of the cane and the loading it; but on many of the plantations they use mules and horses.

The CHAIRMAN. Are there any further questions of Doctor Evans?

Mr. BOWIE. What is the amount you ask?

Mr. EVANS. The increase asked is \$5,000 for the water supply at the Hawaii station. I do not know whether it is so stated there, but in my estimation, in case it is given us, it should be made immediately available, so that we can take advantage of the season in advance of the next rainy season, so that we will be ready to catch and impound what water comes in the next rains.

(At 1 o'clock p. m. the committee took a recess until 2 o'clock p. m.)

AFTER RECESS.

The committee reconvened at 2 o'clock p. m., pursuant to the taking of recess, the chairman, Hon. James W. Wadsworth, in the chair.

The CHAIRMAN. Now, Doctor True, we will take up the experimental work of Porto Rico for a little. How long has the station been established in Hawaii, for instance?

Mr. EVANS. Four years next month.

Mr. TRUE. On the station in Porto Rico we are asking only the usual appropriation of \$15,000.

The CHAIRMAN. What line of work are you doing there? Do you get in touch with it yourself much? Have you been over there at all?

Mr. TRUE. I have not been. Doctor Evans has been there.

The CHAIRMAN. Have you been there, Doctor Evans?

Mr. EVANS. Yes, sir.

Mr. TRUE. I have intended to go, but have not had an opportunity. I have had so much on my hands here.

The CHAIRMAN. Would you prefer to have Doctor Evans give us the details of that?

Mr. TRUE. He can give you more details than I can.

The CHAIRMAN. Tell us about the salaries first.

Mr. TRUE. I have the salary roll here. The total salary roll at present is \$5,700. The director has \$3,000, the horticulturist \$1,300, the farm superintendent \$1,000, and we are paying a coffee expert to the extent of \$400 a year.

The CHAIRMAN. Are those employees all Americans, or have you taken some from the island?

Mr. TRUE. They are Americans, except the coffee expert. He is a man from the island, of Dutch extraction, named Van Leenhoff. He is a planter who has undertaken to make experiments for us. Our force there at present is short. We lost one of our best men. His health failed and he had to be recalled to this country, so that is our entire salary roll at present.

The CHAIRMAN. The average is, of course, higher than that?

Mr. TRUE. Yes, sir.

STATEMENT OF MR. WALTER H. EVANS.

The CHAIRMAN. Tell us what you are doing—what line of work they are pursuing? How long have they been there, in the first place?

Mr. EVANS. The investigations were begun in 1901, near San Juan, at Rio Piedras, on a piece of leased land which proved to be poorly adapted to our purposes, and the legislature of the next year appropriated \$15,000 to a permanent site for an experiment station, and in May, 1902, I went to Porto Rico, at the request of Governor Hunt, to help select a site. They had advertised for offers, and we had some twenty-six places in the island to look over, and finally selected a site at Mayaguez, on the west end of the island. We have a farm there of 220 acres that adjoins Mayaguez, the third town of the island in population.

Formerly it was a general sugar and coffee plantation, and it belonged to a man who was some 80 years old, and he was not very much interested in improving it, and it had run down quite a good deal, and his principal revenue was from pasturage and from a gravel bank and a clay bank, where they were getting material for making bricks. We got that place and started in to make improvements.

The first thing was, we had to practically rebuild most of the buildings and fences, and the lower portion had to all be drained, and we have since constructed an irrigation dam and are irrigating the lower part of the station farm in the dry season, and prepared to get rid of the surplus water by tile drainage in the wet season; and on that we are carrying on experiments with practically everything we think will be adapted to the conditions in Porto Rico. One of the lines of work that has been begun there is that of rice growing at the low level, or what you might call lowland rice.

The Porto Ricans are great users of rice, but grow very little except the upland rice. In fact, I do not remember seeing any in the horseback riding I did in 1902 over the island, except the patches of upland rice on the mountain sides. We are trying to grow the lowland rice under irrigation, and if we make a success of that there is a tract of land on the north side of the island that could be reclaimed and would make a rice field of several thousand acres in extent.

The CHAIRMAN. What is that used for now?

Mr. EVANS. It is overflowed a part of the time.

The CHAIRMAN. It is a swamp?

Mr. EVANS. A regular swamp. But near Arecibo the sea could be kept out, and it is believed by those who have looked into the matter that it would not take very much labor or energy or money to prepare several thousand acres there.

The CHAIRMAN. Which is the cheaper food product, the upland rice or the lowland rice?

Mr. EVANS. The lowland rice.

The CHAIRMAN. It can be produced cheaper?

Mr. EVANS. Yes, sir. The upland rice is in little patches of half an acre or an acre in extent, way up on the mountain side, where the slope is very abrupt, and the conditions of cultivation are very poor. I do not see how they can grow very much up there where the land is subject to washing, as it has been.

The CHAIRMAN. They have grown all they wanted heretofore?

Mr. EVANS. No, sir; and they are great importers of rice. They do not grow one-tenth of the rice used in Porto Rico.

Then we are trying to produce some leguminous crops. Such a thing as a leguminous forage plant is unknown in Porto Rico. We are quite successful in some places, and have grown cowpeas and velvet beans, and in other places have succeeded in getting alfalfa started. It is probable that the first alfalfa ever grown there was started about two years ago in connection with our investigations.

Then another very important line of investigations we are carrying on at the Mayaguez station is that of getting together the varieties of tropical fruits and making a variety of tests to see whether there is not something better than they have there, or means of improving the ones they already have, perhaps suggesting methods of cultivation, but principally methods of handling the fruit when it is grown. We have successfully shipped fruit from Mayaguez to New York and back to San Juan in good condition, a thing which was thought absolutely impossible a few years ago.

It was thought impossible to ship those fruits and have them arrive in a condition so that they would be marketable, but we have shipped from Mayaguez to New York and from New York to San

Juan, making nearly three weeks in transit, and the things were still in good condition.

The CHAIRMAN. What kind of fruit was that?

Mr. EVANS. There were some muskmelons, some tomatoes, and some alligator pears.

Mr. BOWIE. What was the use of shipping them back again?

Mr. EVANS. It was to test the length of time for which they would keep in good condition. The question was, could we successfully ship from Porto Rico, and we doubled them back just so that we could see how much they could stand.

Mr. BOWIE. You would have the California fellows after you if you shipped too much of it.

Mr. EVANS. We would not interfere with them. They do not market in New York very much in the way of winter truck crops. The people of Georgia and Florida will be after us sooner than the California fellows. They do not produce alligator pears or mangoes, though. The Porto Ricans do not produce many first quality mangoes, but we are getting them there and working trying to improve them. In addition to that Mr. May, the special agent in charge, has taken up special work with animals. We have bought a young saddle-bred stallion, and taken him over to see if we could not improve on the Porto Rican horse, which is a very nice little sure-footed animal, but not much bigger than a goat.

The CHAIRMAN. I rode a stallion when I was in Porto Rico which carried me 200 miles. My feet almost touched the ground, but he never faltered, and at the end he seemed just as strong as a big horse 16 hands high.

Mr. EVANS. Another question we are going to take up with the authorities is that of the mule. The insular authorities are going to furnish the money to buy three jacks and put them in different parts of the island and see if we can produce mules for the plantations.

The CHAIRMAN. From the little native mares?

Mr. EVANS. Probably; they will select the best ones they can find. You know that the ox is the main thing there and he is very slow going.

The CHAIRMAN. He goes faster than our oxen do?

Mr. EVANS. He does, very much. You take them on the good roads, and they will cover that stretch from San Juan to Ponce a good deal faster than our oxen would.

Mr. CANDLER. Are they good oxen?

Mr. EVANS. Very fine. They have some of the finest oxen down there I have ever seen.

Then we are going to take up experiments to improve some of the hogs they have down there. We have already made some purchases of hogs.

Mr. CANDLER. What kind of animals have you sent there?

Mr. EVANS. They have purchased some hogs from North Carolina, that, I think, are grade Berkshires; I am not sure. We are trying to introduce other new industries. We have established quite a plantation of rubber trees in Porto Rico.

Mr. BOWIE. Has that ever been demonstrated to be a commercial success in any way?

Mr. EVANS. Yes, sir; in some places in Ceylon and the Straits Settlements.

Mr. BOWIE. I mean in Porto Rico?

Mr. EVANS. In Porto Rico there is practically no commercial rubber growing. There were no rubber trees cultivated on the island until we began two or three years ago this collection that we have. There were a few species there of rubber-producing plants, but nothing in the way of commercial plantings. Specimen trees scattered here and there over the island do very well. Another thing we are trying to do is to introduce grape growing. There are a few grapes grown on the island, but very few, and there is no question in our minds but what grape growing can be extended quite a good deal, especially on the dry side, the south side of the island.

Mr. LORIMER. Are they doing anything in the way of growing onions now?

Mr. EVANS. I have a manuscript now on the growing of vegetables, which includes the growing of onions. The people of Porto Rico consume a great many onions, and they grow very few. Practically all that are consumed are imported. But we have shown that they can grow onions there.

Mr. LORIMER. I ate some very fine onions that were grown there just outside of San Juan.

Mr. EVANS. Some of those gardens there are doing very well.

Then another of our important investigations, in a way most important, is our coffee experiments that are being carried on up in the interior, at La Carmelita. They are being conducted on a sort of a cooperative plan with the owners of this plantation. They have given us ten acres of the plantation to do absolutely as we please with.

The experiments with coffee are under the immediate charge of Mr. Van Leenhoff, who spent ten or more years in Java before coming to Porto Rico, and they have already shown the possibility of greatly developing the production of coffee in that island. We found the best thing to do was to very much reduce the shade from what was the ordinary custom and to prune the trees, making gathering very much easier. One of the prime conditions of success was to start the seedlings in a seed bed, and from there transplant them into a nursery bed, instead of going out into the woods and gathering, haphazard, the seedlings and setting them out without any preliminary cultivation of the soil. In the three years that we have been experimenting on this line we have succeeded in having three-year-old trees produce 2 pounds of clean coffee to the tree, as compared with an average of less than a pound of coffee to the tree for the rest of that plantation. That has been done by these methods, which are easy to carry on and are possible of application by anyone who is competent to appreciate the situation.

The CHAIRMAN. Under the Spanish Government did they have anything in the way of experiments there?

Mr. EVANS. Near Mayaguez they had what they called the Agromonic station. It was a 7-acre tract, which has since been given to us, on which they fixed up an experiment station; but the principal investigations were with fertilizers. The man in charge was a chemist, and he spent most of his time in analyzing fertilizers and in ex-

ploiting a fertilizer that he and some others found on the island of Mona.

The CHAIRMAN. How much money do you get from the Porto Rican government?

Mr. EVANS. The last session of the legislature they did not give us any direct appropriation. Last year they gave us about \$500 altogether, and two years before that they gave us something like \$2,000—\$2,700 altogether, I believe it was.

The CHAIRMAN. They do not make a regular appropriation?

Mr. EVANS. They make no regular appropriation. I talked with the governor when he was here this winter and tried to urge him to make a regular appropriation for the station; but he seemed to think it would be better to make appropriation for specific things rather than to make an appropriation to the station as such. They appropriated \$10,000 last session of the legislature that is being devoted to live-stock introduction and the cultivation of fiber plants, principally the sisal. They appropriated \$10,000 last year, and it is being expended for definite purposes—on the sisal and live-stock experimentation.

Some of the other investigations we have carried on there are very important. In regard to the coffee investigation, there is a very troublesome insect known as the leaf miner. It gets in between the upper and the lower part of the leaf and skeletonizes the leaf. Our botanist found a parasite for the miner in a certain part of the island of Porto Rico, and he succeeded in propagating enough until the small tract of coffee that we have on the station at Mayaguez was practically free of the leaf miner. This parasite that was working on it was introduced on some of the other plantations, and the probabilities are that if that is followed up it might be that the ravages of this leaf miner might be held in check very materially. Unfortunately at present we have no entomologist there.

There are a number of other problems in relation to various diseases of the economic plants of Porto Rico that are being given consideration; and we are also considering methods of farm management. The probabilities are that the greatest good we can do to that island, if we can do it, is to revolutionize their system of agriculture by getting them to use fertilizers and to use a plow instead of using a stick and no fertilizer. As an illustration of the difference between agriculture in Porto Rico and Hawaii, I was in Porto Rico in 1902, and I had with me the report of one of the largest sugar plantations of Hawaii. I showed it to the owner of a large sugar plantation, and he expressed doubt as to the accuracy of the report, in which the Ewa plantation reported an average yield of nearly 11 tons of sugar to the acre under their system of intensive cultivation, while in Porto Rico an average of 2 tons is considered a high average.

If we should show by better cultivation the use of fertilizers and irrigation, that they could increase their production, we would succeed in doing some of the good things we hope to do for them.

The CHAIRMAN. What have you done along tobacco lines?

Mr. EVANS. We began tobacco investigations with the \$2,300 given us by the insular government three years ago; but the work was begun and carried through one year and then for want of appropriation it was abandoned two years ago.

Mr. LORIMER. What was the result of that year's work?

Mr. EVANS. We think that the results as shown by that year's work were favorable in that they would show the possibilities of certain regions in producing a better type of tobacco, and the principal thing we tried to show them was the improved method of curing the tobacco in order to get a more uniform quality, a thing that is an impossibility under their haphazard methods.

Mr. HENRY. Have you experimented with the shade growing?

Mr. EVANS. With the shade and without.

Mr. HENRY. Was any grown there under shade?

Mr. EVANS. Yes, sir.

Mr. HENRY. How much?

Mr. EVANS. I have no idea of the relative amount. In 1902 I saw quite a number of places where they were just beginning to experiment.

Mr. HENRY. You do not know how that is now?

Mr. EVANS. No, sir.

Mr. HENRY. Then you do not know what kind of wrapper it was?

Mr. EVANS. I could not say what the quality of it was, now.

The CHAIRMAN. Are there any further questions about the Porto Rico station? If not, you may continue with your statement, Doctor True.

STATEMENT OF A. C. TRUE—Continued.

There was one other thing about Porto Rico and the other outside stations that I wished to say. Further up on that page there is a proposition to grant leave of absence to employees of the Government in Porto Rico, Hawaii, and Alaska.

The CHAIRMAN. We understand about that.

Mr. TRUE. I thought perhaps that would need some explanation. It is a matter of some importance to us. This is a fact with reference to that, that is very difficult for us to get the right kind of men, to hold them and to keep them satisfied, if there is no provision for vacation. The experiment-station workers in the country generally have at least a month's vacation. That is the practice, of course, in the Department at Washington.

Now, when we come to make engagements with people to go to these outside regions, that is one of the first questions that is likely to come up, and we must either meet it by making the salaries sufficient to provide for a vacation by furlough, or run the risk of having those men go out there, and after they have been there a short time becoming dissatisfied. We have lost a number of people already. The force has changed rapidly, and I am sure that has been one of the items that has caused the change. Residence in those regions is largely an exile for such people as we have to get, because we have to depend on people who have been trained in this country rather than on the local people, and it seems only fair to them, and a just arrangement, that they should be granted this usual leave of absence. Take the man who left our Porto Rico station on account of his health. He was one of our most successful workers, and he has now been transferred to the Department of Agriculture, in the Bureau of Plant Industry, where he gets his annual vacation as a matter of course. But in Porto Rico there was no provision for that.

The CHAIRMAN. It was a question of the climate there not agreeing with him, was it not?

Mr. TRUE. Yes, sir; but that is one of the factors, it seems to me, that we have got to provide for in one way or another. Men must have an opportunity to get out of the tropical climate.

Mr. LORIMER. Are Government employees in other departments given leave of absence generally, in Porto Rico?

Mr. TRUE. Yes, sir; there are provisions for leaves of absence in different appropriation acts.

The CHAIRMAN. Outside of the city, I think they have two weeks' leave.

Mr. LORIMER. I think, generally, they have thirty days.

The CHAIRMAN. It takes a week to get there and a week to get back, and it would only give a man two weeks in this country.

Mr. TRUE. Yes, sir; of course, the ocean voyage is good for them; but to have no provision of that sort is hard.

Mr. BOWIE. You have no provision of that sort?

Mr. TRUE. No, sir.

Mr. BOWIE. You want to provide it in the bill?

Mr. TRUE. Yes, sir.

The CHAIRMAN. The amendment is in the bill, as follows:

And the employees of the experiment stations in Alaska, Hawaii, and Porto Rico may hereafter, in the discretion of the Secretary of Agriculture, be granted leave of absence not to exceed thirty days in any one year without additional expense to the Government.

Mr. BOWIE. What do those words "without additional expense to the Government" mean? Are they not to be paid during the thirty days' leave of absence?

The CHAIRMAN. They shall not employ any other people to take their place. The work goes on with the present force.

Mr. FIELD. Do they furnish transportation, or—

The CHAIRMAN. No, sir; they furnish their own transportation.

Mr. FIELD. When Doctor Georgeson comes here, does he pay his own expenses?

Mr. TRUE. No, sir.

The CHAIRMAN. Is there an order for him to come?

Mr. TRUE. Yes, sir; he came on an order from the Secretary's Office for him to come.

The CHAIRMAN. How long does he remain here?

Mr. TRUE. A couple of months.

The CHAIRMAN. What is the necessity for him to come?

Mr. TRUE. He had his report to write up, and we have no stenographer at the station in Alaska; and then, more than that, he is looking about with reference to this cattle question to determine what is best for him to do.

The CHAIRMAN. He has come every year for the last eight years?

Mr. EVANS. No; he was not here last year.

Mr. TRUE. He has come three or four times in that period, I believe.

The CHAIRMAN. Passing to page 42, we come on this old item of nutrition investigations.

Mr. TRUE. Before we reach that there is an important item at the end of page 41.

The CHAIRMAN. The preparation and printing of charts?

Mr. TRUE. More than that. We are asking for an increase of appropriation with reference to the work for farmers' institutes and our educational work; and that includes, of course, this matter for the preparation and printing of charts, but that is not the entire work.

The CHAIRMAN. You ask an increase from \$5,000 to \$13,000?

Mr. TRUE. Yes, sir.

The CHAIRMAN (reading):

To investigate and report upon the organization and progress of farmers' institutes and agricultural schools in the several States and Territories, and upon similar organizations in foreign countries, with special suggestions of plans and methods for making such organizations more effective for the dissemination of the results of the work of the Department of Agriculture and the agricultural experiment stations, and of improved methods of agricultural practice; and the preparation and printing of charts and other illustrative materials for the use of farmers' institutes and agricultural schools.

You want \$8,000 additional for this purpose?

Mr. TRUE. No, sir; not for the charts; although that seems to be the only new item. That is the reason that I desired to make the explanation. We have had thus far, and for several years, an appropriation of \$5,000 for work in relation to the farmers' institutes. Now, in connection with that work, along with it, although not directly associated with it, has been work for the promotion of agricultural education in schools. There is now a wide movement in the country for the extension of agricultural education beyond the colleges of agriculture, to schools of lower grade—high schools and rural schools. Already in thirty States some provision is made for such teaching, but the movement is in its beginning, and we have been called upon through our relations with the agricultural colleges and experiment stations to aid in that movement, and we have already done something along that line.

Now, what we desire to do is to have about \$5,000 of this appropriation which we are asking for devoted simply to this work of the promotion of agricultural education, and I can illustrate briefly in what ways we are doing that. I was asked by the president of the State Teachers' Association of California and the president of the State Farmers' Institute to go to California during Christmas week to attend the joint meeting of the State Teachers' Association and the State Farmers' Institute. There were gathered there some 7,000 people at the University of California, where the agricultural college and experiment station are located. They were teachers, school officers, boards of trustees, and representative farmers. The uppermost question in that meeting was the promotion of industrial education.

The governor of the State came to the meeting and made a very strong address, showing by statistics, which he repeated over and over again to make them emphatic, that the children, and especially the boys of California, were leaving school at such an early age that the schools were not making a very definite impression upon them; they were drifting to the cities and there either were getting on very poorly as industrial workers or else were drifting into criminal courses. And he besought the teachers to do something to remedy that state of things.

The matter of education with reference to agriculture was brought up, and in the opinion of most of the people there, at the outset the

thing seemed to be very much in the air. The cry was, "We do not know what we want to do." My office there was to show them that a good deal had already been done and that we were preparing to set forth a fairly definite programme with reference to agricultural education in the public schools. As the result of that meeting a committee of California teachers, officers of the agricultural college, and others was formed to continue the work, and they have asked our assistance in the matter; so that we would like to follow that up and help them in California to put into operation some system of agricultural education in their schools.

In the State of Kansas, to give another view of the matter, they have a system of county high schools, but those schools have thus far given very little attention to industrial subjects of any kind, and none whatever to agriculture. However, there is a desire that they should do something along that line, and we were appealed to last fall for help. The Secretary desired that we should take the matter up, and one of the men from my office who is familiar with such matters was sent out there to one of the counties to take the matter up with the county superintendent of schools, and in company with him and some other influential people went about in the county explaining to farmers and others interested in this county school what might be done along the lines of agricultural education. The result of that was that a course in agriculture was outlined, and has been started in that school. Those are examples of the kind of work that we are called upon to do, and under present conditions the demands on us for work along those lines are beyond what we can meet.

We have not had any appropriation for this matter especially. I have devoted a little of the time of one of my men to keeping track of the progress of agricultural education, and I have occasionally gone to such meetings as I describe; but I think we ought to have in the Department—and we represent the Department of Agriculture in this matter—the services of one good man who could work along that line; and that, with his expenses, would virtually exhaust the appropriation that we have asked for.

Mr. CANDLER. What farmers' organization was it that met in Washington here in November? Was it not the National Farmers' Institute organization?

Mr. TRUE. Yes, sir; that was the national organization of Farmers' Institute Workers.

Mr. CANDLER. Did they indorse this object by resolution in that meeting?

Mr. TRUE. Yes, sir.

Mr. CANDLER. I think that resolution was unanimously passed.

Mr. TRUE. Yes, sir.

Mr. CANDLER. Have you had any request for help in this line from the State of Mississippi?

Mr. TRUE. Yes, sir.

Mr. CANDLER. It is the same kind of work you spoke of with reference to California and Kansas?

Mr. TRUE. Yes, sir.

Mr. CANDLER. The reason I asked is that the last legislature of Mississippi made the study of the elements of agriculture a part of the curriculum in the public schools throughout the State and re-

quired them to be taught in the schools; and Mississippi spends 75 per cent of her revenues for education.

Mr. TRUE. They conducted at the agricultural college in Mississippi last summer a summer school particularly for teachers in the public schools, and we were asked to send a man there for a week or two to speak to the teachers along those lines.

The CHAIRMAN. Several years ago, when the appropriation was made for aid to farmers' institutes, the objection was that the States ought to attend to that thing; but we started into it, and it at once commenced to grow. Where will you put a limit to it? Why is it not peculiarly the duty of the State to attend to these things? Why should the National Government be called upon in all instances and cases to do this work? You might as well do away with the experiment stations of the particular States and do away with the farmers' institutes. That is the tendency and the drift of the whole thing.

Mr. TRUE. It seems to me it is a somewhat different proposition. We are not undertaking to run schools or farmers' institutes. We are simply endeavoring to act, just as we act for the experiment stations, as a clearing house for a great educational movement along agricultural lines. The fact is this at present, that the experiment stations and the Department of Agriculture have gotten together a vast mass of material as the result of their investigations; but that is not utilized as it ought to be, because the people of the country—the farmers and the young people, as they come onto the farms—are not in the proper attitude of mind and have not the proper training to appreciate that material and take it and utilize it.

Moreover, the material itself has not yet been reduced very far to the proper form for its utilization in the schools. So that we have two functions, it seems to me; one is to try to promote the further establishment of the farmers' institutes and courses in agriculture by using our influence in that direction wherever we have opportunity, and the second is by working on these materials to get them in proper form and have them properly distributed among the educational people who have to use them in the schools. That is one of the lines of work we have in the association of agricultural colleges and stations. We have standing committees on agricultural education, and on what is called the extension work, which relates to the farmers' institutes and farmers' correspondence courses and all that sort of thing. Those committees, to do their best work, must have our aid, and they recognize it by asking us to give them our aid.

The CHAIRMAN. Why should you give it? Why should the Government do this work and not the States? Are the States not able to do it?

Mr. TRUE. The States are doing that work and the Central Government is coming in to aid them a little.

Mr. BOWIE. Let me make a suggestion.

Mr. TRUE. Yes, sir.

Mr. BOWIE. The main thing they want is somebody to draw them a crowd, somebody that they feel can give them some additional information. They believe that when an expert from the Department of Agriculture in Washington comes and tells them anything as the result of experiments, it is reliable and valuable.

The farmers believe that when an expert from the Department of Agriculture comes on and talks to them, he gives them information

that is of value, and it helps to get a crowd and to get interest. They work that end of the line, and they want this end of the line worked. Is not that the idea?

Mr. TRUE. Yes; but we are not attempting that, exactly. We try to influence the influential people and have the movement started in the States.

Mr. LORIMER. The theory is that in teaching these schools we are teaching the young men to go to work on the farms instead of coming into the city. What you are doing is teaching them that they can do as well or better in learning how to farm, and to stay at home.

Mr. TRUE. Yes, sir. I have explained now about how \$5,000 of this increase would be used—that is, to promote directly the work relating to the agricultural schools. The remainder we would set apart for the preparation of charts, as it states here, and other illustrative materials for use in the farmers' institutes and in the schools. There is a considerable demand that we should do something more along these lines than simply prepare bulletins; and, going over this matter with the farmers' institute workers especially, we find that one thing which they especially desire is the making of good charts which can be used in connection with the lectures, and so we have provided this item with reference to that. That is, we do not propose any increase in the general business which we are doing with reference to the farmers' institutes, for which we have \$5,000 already, but simply—

The CHAIRMAN. Do you consider that \$5,000 a permanent annual appropriation?

Mr. TRUE. It seems to me it is desirable to go as far as that.

The CHAIRMAN. How long will you continue it; forever, annually, every year, year after year?

Mr. TRUE. It seems to me that is an indefinite matter, just like all the other appropriations.

Mr. LORIMER. It looks like something that will come to stay if it comes at all.

The CHAIRMAN. The trouble is, all these things come to stay.

Mr. LORIMER. The creamery matter may go out in a year or two, but this will not only remain, but will grow larger.

Mr. TRUE. Of course the States are increasing their work along the farmers' institute lines, but it will take a long time before all the farmers are reached by these things. Of course in a few States like New York they are reaching them pretty well, but in most of the States a great many farmers are not touched at all by such meetings.

The CHAIRMAN. They would be touched if they were willing to be touched, but they do not care; that is the trouble.

Mr. TRIMBLE. I will tell you something about these Government people. We had down in our State these farmers' institutes conducted by a commissioner of agriculture. They would get expert men from different States, but they always like to get a Government man. People always think they have superior knowledge on these subjects, and they are put in a position where they can get more knowledge than everybody has. A Government man always draws a crowd.

Mr. LORIMER. I take it from discussing this appropriation that the intention is to ultimately run it into the schools. You take the superintendents of the schools and start in on the boys?

Mr. TRIMBLE. If you get the farmers educated, they will demand of the State legislatures to do more. And nobody has any idea of the ignorance among the farmers as to scientific farming.

Mr. LORIMER. I have had a lot of experience. You simply can not get them to read, and even after they read you can not make them believe it.

The CHAIRMAN. Is that all you care to say on that item, Doctor True?

Mr. TRUE. Yes, sir; that is all I care to say on that now.

The CHAIRMAN. We come next to that "nutrition" item.

That has continued about ten to fifteen years to my positive knowledge. I want to know about the organization of that thing, and how the money is expended. Just go into details with regard to that expenditure, and as thoroughly as you can. This reads:

To enable the Secretary of Agriculture to investigate and report upon the nutritive value of the various articles and commodities used for human food, with special suggestions for full, wholesome, and edible rations less wasteful and more economical than those in common use, including special investigations on the nutritive value and economy of the diet in public institutions; and the Secretary of Agriculture is hereby authorized to employ such assistants, clerks, and other persons as he may deem necessary in Washington and elsewhere; and the agricultural experiment stations are hereby authorized and directed to cooperate with the Secretary of Agriculture in carrying out such investigations in such manner and to such extent as may be warranted by a due regard to the varying conditions and needs of the respective States and Territories, and as may be mutually agreed upon; and the Secretary of Agriculture is hereby authorized to require said stations to report to him the results of any such investigations which they may carry out, whether in cooperation with the said Secretary of Agriculture or otherwise, twenty-five (twenty) thousand dollars.

In the first place, who are paid from that lump sum?

Mr. TRUE. In the first place, these investigations are carried on at a number of colleges and experiment stations throughout the country. The principal place of investigation is at Middletown, Conn., where the work originated under Professor Atwater, who was for a number of years director of the Storrs Agricultural Experiment Station. But, as I said, the work has spread from there to a number of different States. The plan is to employ experts along the line of human nutrition, and to enable them to carry on definite investigations on this subject.

The work is in progress now in Maine at the agricultural experiment station; in Connecticut, at Middletown, Conn.; in New York, in connection with Columbia University, New York City; in Illinois, at the University of Illinois; in Minnesota, at the agricultural experiment station; in California, at the agricultural experiment station, and in Louisiana, at the experiment station. We may also do some work this year, as we have done in other years, at the University of Tennessee, at Knoxville, Tenn. The larger enterprise, as I say, is at Middletown, Conn., where between \$6,000 and \$7,000 of the appropriation is spent. At the other places from \$500 up to \$1,500 has been spent for the work.

The inquiry, as a whole, is devoted to four general classes of investigations: Dietary studies—that is, the determination of the food habits of people of different occupations and classes; digestion experiments, in which we determine with human subjects the natural

digestibility of different foods and make analyses of the foods as consumed, and of the fæces, the waste products, generally, so as to determine the actual digestion; respiration calorimeter experiments, and cooking experiments.

The CHAIRMAN. This appropriation has been going on for fifteen years.

Mr. TRUE. About a dozen years.

The CHAIRMAN. Please tell the committee, if you can, what they have demonstrated that is of practical use to human beings in the way of food and nutrition.

Mr. TRUE. We have made in that time about 800 dietary studies of people, in different parts of the country and of different occupations, farmers, and mechanics, and professional men, negroes, the poor white people of the South, and so forth. These studies have shown definitely the amounts of food these people are accustomed to eat, the cost, and the nutritive value of their food. For example, it has been shown that the negro people of the South have a diet which is deficient in those elements which give strength, which undoubtedly has some effect on the effectiveness of labor—that is, they have been accustomed to eating too much fat food, and hominy, and things of that sort, and not enough meat of the right kind, or wheat, which would be a better diet—that is, their present diet is what is called a badly balanced diet.

The CHAIRMAN. Have you induced them to change their diet in any way?

Mr. TRUE. Our publications have been issued showing those matters.

The CHAIRMAN. Now, follow the example up a little further. Give us another case.

Mr. TRUE. In other cases we have shown, for instance, as regards the professional man in this country, that as a rule he eats too much, especially of meat; that he would be better off if he had a somewhat lighter diet, and relatively more vegetable food. We have also shown that such people often eat a too expensive diet; they could get along just as well and perhaps be better fed at less expense.

Of course this is simply one line of work. That material, prepared in bulletin form, both in the farmers' bulletins and in technical bulletins, has gone out very widely, and is being used in thousands of schools in this country and by women's clubs, and by public institutions; and in some States—that is true of New York State as I understand it—those results have been utilized in public institutions, such as insane asylums, to reform the diet and make it on the whole more satisfactory, and at the same time less expensive. One experiment was here in the District of Columbia, over at St. Elizabeth, and we found there that they were dealing very generously with their people, both the employees and the patients, but with the result that they were wasting a large amount of food; and, more than that, that as regards their patients, in many cases they were giving them a diet which was ill adapted to them. Since that time the superintendents of the asylum at St. Elizabeth have made changes in their diet on the basis of our investigations.

Mr. LORIMER. What is the need of following this investigation, doctor?

Mr. TRUE. That work that I have described is our simpler work. But beyond that we have made what are called digestion experiments,

in which we determine the actual digestion of different foods; and there, of course, we must distinguish between what is ordinarily called the ease of digestion and the actual digestion. I may drink milk, for instance, and it may not agree with me. I will, therefore, suffer a great deal of discomfort. But in the end that milk may be thoroughly digested in my body. It is desirable for many purposes to determine the actual digestibility of many kinds of food.

Mr. LORIMER. In the case of milk, what do you recommend—that a person should drink the milk whether it agrees with him or not?

Mr. TRUE. The question would arise in regard to milk in this way. In families and institutions it is a question whether the addition of milk to the diet really furnishes very much actual nutriment, or whether it adds very largely, especially in cities, to the expense of the diet. We have determined that milk adds to the actual nutrition, and we have determined that in a definite way, so that we can estimate what it adds, and the reasonable expense, therefore, for milk diet. And beyond that, we have determined that when milk is taken alone, on the average it does not digest as fully as if it is taken in connection with bread or cereal or mixed diet.

Take the matter of flour, for instance. That has been one of our most important investigations. As soon as the so-called breakfast foods came very largely into the market and made very large claims for themselves, a great many people got the idea that flour was a poor kind of food, and you will find that in various books and advertisements and so forth. But our investigations, which were conducted chiefly in Minnesota, but also, in order to check up the results, at other places, have definitely shown that flour has somewhat the advantage of other forms of wheat preparations as regards its actual digestibility; that the very fact that it is finely ground adds to its digestibility, instead of the opposite, as many people have been led to suppose; and those investigations have not been disputed, so that I suppose that fact is established.

We have taken up this last year the subject of the breakfast foods, and we shall shortly issue a bulletin along that line which will show definitely how far different forms of such wheat preparations are digested.

Mr. TRIMBLE. Will you name the preparations—the different brands?

Mr. TRUE. I should say not the brands, but the types. We shall, of course, avoid furnishing advertising material for certain brands of breakfast foods. But they can be classed pretty well on certain types, so that our statements can be definite enough without being specific.

Mr. TRIMBLE. Yes.

Mr. TRUE. We are proposing now to continue this study with reference to corn and corn preparations and with reference to rice. Then we are doing the same thing for meat and for fruits, and that work is more elaborate, progresses more slowly, and it is not by any means finished.

The CHAIRMAN. It sums up in this way—that you decide these things from the scientific point of view, and your results are very valuable. I grant that. Then the question is to make the professional man and the negro and the farmer each live on what he ought to live on. Now, he will not do it. From a scientific point of view those

results are very valuable, and if people want to follow those lines they can do so; but practically, they will not do it.

Mr. TRUE. That is a matter of slow education.

The CHAIRMAN. The idea is that this matter can go on slowly year after year, and I do not see why you should ask any increase in this item. Outsiders may adopt and practice your conclusions or they may not. In public institutions you can give to those people these foods and they must eat them, because they can not get anything else, and you may say that those results are useful there, but they are not out in the world. It is not available. People eat what they like to eat, and they will continue to do so.

Mr. TRUE. Changing the food habits is largely a matter of education and is very slow; but, as a matter of fact, I think that wide observation has shown that the food habits of the people of this country are changing, and in the direction—

The CHAIRMAN. They are changing, but not as result of these experiments. They are changing from the immense influx of foreigners into this country, each one of whom brings his own ideas and his own foods.

Mr. TRUE. I think it is a fair claim, from our investigations, that we are changing the teaching along these lines in the medical schools of the country, and we are reaching them very directly, and they are beginning to realize that they ought to give much more attention to dietetics than they have in the past.

Mr. LORIMER. After you have gone into this subject so thoroughly and determined so many things, what is the reason for the increase of the appropriation now, as certain lines of work have been finished and done away with?

Mr. TRUE. We desire to continue our investigations, and also to make larger efforts to diffuse the information which we have gained, and that is the special object at this time in asking for an increase of the appropriation.

The CHAIRMAN. I suppose it is to employ certain clerks and employees in the city of Washington. That is the amendment, "such assistants, clerks, and other persons as he may deem necessary in Washington and elsewhere." That power was not given before.

Mr. TRUE. That I wanted to explain. But that has little relation, really, to the request for an increase. The increase we desire especially to enable us to undertake what may be called demonstration work along these lines.

The CHAIRMAN. You mean something like what Doctor Wiley is doing on different lines?

Mr. TRUE. No, sir.

The CHAIRMAN. Doctor Wiley is trying to find out the effect on health of the adulteration of foods.

Mr. TRUE. No, sir; that is not our object at all.

The CHAIRMAN. Would you experiment along the lines of the nutritive qualities of foods?

Mr. TRUE. Yes, sir; that is all we have to do with.

The CHAIRMAN. Would you establish classes, as he has?

Mr. TRUE. Not in the way he has. He is making an investigation here in Washington, with men, of the effects of certain adulterations of foods. We are doing that all the time on the nutritive values of normal foods.

The CHAIRMAN. At the experiment stations?

Mr. TRUE. Yes, sir. Now we want to take the results we have obtained and show how they can be applied, by being put into position to attend meetings of farmers and teachers and women in different places—representative meetings—and making actual demonstrations of the results of this work. And we think that the little money put into that kind of thing will do just what has been brought out here to be a very desirable thing to do, namely, to diffuse this information and make it of some practical use.

The CHAIRMAN. How would you give a practical demonstration of it?

Mr. TRUE. That will have to be done by furnishing the agent who would do that work with some simple equipment by which he can actually make certain simple experiments in the presence of an audience.

The CHAIRMAN. In cooking, you mean?

Mr. TRUE. Yes, sir; cooking experiments.

Mr. COCKS. How would that determine the nutritive values? You would have to feed it for more than one feed.

Mr. TRUE. We can show what the constituents are; how the food is actually digested.

Mr. COCKS. How will you show that?

Mr. TRUE. By bottles or tubes containing different sorts of material, and in other ways. It is an effort to get out and really teach people about this matter.

Mr. TRIMBLE. Do you not think a good way to make this information useful would be to send experts to public institutions and have them adopt a line of food, or method of feeding?

Mr. TRUE. Yes; that would be included. Now, this movement in reference to nutrition as a part of what is called commonly domestic science in the schools is in just the same condition as the teaching of agriculture is. A great many people desire to do it, but they do not know what to do or how to do; and by going to representative assemblies in various parts of the country we can show them what to do and how to do it, and thus aid in the dissemination of the work.

The CHAIRMAN. You would establish sort of cooking schools, would you not? Would not that be the practical result?

Mr. TRUE. No, sir; not in the ordinary sense. We would confine ourselves to the dissemination of the results of our investigations.

The CHAIRMAN. You would want some small, simple apparatus.

Mr. TRUE. I am informed, for instance, that they are to hold at the University of Illinois this summer, where we are doing some work on meats particularly, a summer school, to which they will invite especially the teachers of domestic science from the schools in Illinois, of which there are a considerable number now. We would like to be in a position to send at least one of our men there, and show these people what we have gained, and explain to them just what it means, because it does take time to get these ideas into the heads of people, even people that have some education.

I have not really explained yet our most complicated and in some respects most important investigations, because we go beyond this matter of simple digestion experiments and make experiments in a special form of apparatus known as the respiration calorimeter, which is a large box with proper attachments in which a man can live for a

number of days, and where we can determine all the income of his body and all the outgo of his body, so that we can tell just what amount of energy is produced by the food that he eats. That was an apparatus invented by Professor Atwater and his associates, and is now at Middletown, Conn., where we are carrying on experiments.

This year the Bureau of Animal Industry was making experiments in the curing of cheese at different temperatures and under different conditions. They asked us to undertake experiments with cheese to determine its digestibility and whether there was anything in the idea that cheese cured in different ways was more or less digestible; whether the method of curing made any difference in the digestibility.

When we came to look into that matter we found that there had been very little work done anywhere with reference to the digestibility of cheese, so that nobody practically, physician or other person, could tell how far cheese was a digestible food. We are seeking to determine that partly through digestion experiments and partly through these respiration calorimeter experiments, which include digestion experiments and involve a good deal more. For that purpose we have followed at Middletown somewhat the same plan that Doctor Wiley has followed in his experiments with reference to the adulteration of foods. That is, to make the experiment satisfactory, we have brought in a considerable number of persons, and within the last few months we have made about 150 different experiments of three days each.

In these the subjects, the most of whom are college students, are brought into our work by giving them a little bonus to the extent of a couple of dollars for each experiment, and these young men to the number of sixteen at any one time are fed a diet consisting of cheese, bananas, and bread. Now, we know the digestibility of bananas and of bread from our previous work, and from the results that come from this diet we can therefore calculate quite accurately the digestibility of the cheese. Some surprising things have come out of that. We have fed the men about 6 ounces, perhaps a little less, say, 5½ ounces, of cheese a day.

The CHAIRMAN. For how many days?

Mr. TRUE. Three days in the week, and then drop off, and repeat next week; and that has been going on for three months or more.

We expected in advance to have a good deal of trouble, because it has always been commonly supposed that people could not eat much cheese without digestive difficulties, but so far we have had very little trouble. Nobody has abandoned the experiment because of illness. A couple of men gave it up because they got tired of bananas and bread and cheese. We have had almost no difficulty with constipation. Now, when that investigation is completed and verified—and it ought to go on long enough so that we may be sure of our results, so long as we have gotten into it—we will have a body of information on that subject that has never been obtained elsewhere, and we will be able to speak authoritatively as nobody has been able to speak on that subject before. It perhaps ought to be explained to the committee, as it doubtless will come to their attention in one way or another, that Professor Atwater, who inaugurated this work and has had charge of it directly for a number of years, has within the

past year become a hopeless invalid, so that he has passed out of the work.

Fortunately, he had associated with him for ten years, a man who has taken his place, Doctor Benedict, who is amply qualified both by training and by experience to continue the work, and we have a relatively trained force about him, a few people who have been with him some time; so that there has been no interruption in the work. And yet that has made it seem desirable to make a certain change in the management of the work. Professor Atwater was a man of wide experience. He was the first director of the first experiment station, and he was the first Director of the Office of Experiment Stations, and was accustomed to deal in a wide way with men and affairs. Professor Benedict, on the other hand, is essentially an investigator, and it seems highly desirable, therefore, that his energies should be concentrated on the work of investigation, and that we are doing.

But it is necessary for us to carry on a large correspondence, to edit a considerable number of publications growing out of this work, to make the arrangements with a number of institutions with which we cooperate, and to follow up the work in general, and we desire to do that from Washington.

That will not involve any actual increase in our force under present conditions, but it will involve a change in the wording of the appropriation act, if we are to spend any of that money at Washington. That was not understood when the last appropriation bill was passed. Ever since this work was started we have spent some of the money at Washington; but under recent rulings of the Department, I suppose the Treasury Department backing that, we have been prohibited from spending any of this money in Washington.

The result has been that we have had to do such work as needed to be done in other ways, and with great inconvenience. As long as Professor Atwater was in charge of the work a very considerable portion of our editorial work was done at Middletown. Under present conditions I think it could be more effectively done if it were done here under our direct supervision. Hitherto we have paid one of the men connected with the staff of the Experiment Station Record the major portion of his salary out of the nutrition investigation fund. He receives this year a salary of \$2,250. We paid, I think, last year \$1,500 of his salary out of the nutrition fund. This year we have been debarred from doing that by the ruling against it. We have an editorial assistant, one or two computers, and a stenographer, at Middletown, who are engaged very largely in editorial work. I think it would be better now to transfer these people here.

The CHAIRMAN. To transfer the people or the work?

Mr. TRUE. The work and the people. We can not do the work without having the people.

The CHAIRMAN. I did not know but what you would have other people do it.

Mr. TRUE. No, sir. The arrangement would be to have this man who has hitherto been paid out of the nutrition fund be paid out of that. He would become our expert here, looking out for the general interests of the work; and then associated with him would be this small editorial force, who would carry on the editorial work and the correspondence connected with the investigation. This investi-

gation has been a very successful one; I am sure you would see that if you looked into it closely.

And it is bringing us a large amount of work in the way of correspondence; because we try not only to satisfy people with our publications, but to answer their inquiries, especially those from teachers, medical men, and superintendents of public institutions. It is absolutely essential that we should have a small force here in Washington, it seems to me, to effectively carry on that work under present conditions.

Mr. TRIMBLE. What was the object of having this work carried on in Middletown?

Mr. TRUE. The reason that that was done was that Professor Atwater, who originated this line of work, was at that time director of the Storrs experiment station in Connecticut, and also a professor in Wesleyan University, and had begun to make investigations along this line. We paid him for a portion of his time only, and in that way got a very economical arrangement, and the cooperative plan generally for this investigation has, I am sure, given us results which we could not have procured for the same money in any other way; because, added to what Congress has given us, have been the facilities at these different institutions for research—laboratory room and apparatus, and experts whose time could be partially employed.

(At 4 o'clock p. m. the committee adjourned until to-morrow, Thursday, February 15, 1906, at 10.30 o'clock a. m.)

COMMITTEE ON AGRICULTURE, HOUSE OF REPRESENTATIVES,
Washington, D. C., February 15, 1906.

The committee met at 10 o'clock a. m., Hon. J. W. Wadsworth in the chair.

HEARING ON THE EXTERMINATION OF THE TEXAS FEVER TICK.

The CHAIRMAN. Gentlemen, we will have a hearing this morning on the question of the extermination of the Texas fever tick. Some members of Congress are here and I believe want to be heard, and there are present some gentlemen from the Southern States. Mr. Ransdell, I think you have the matter somewhat in charge. Suppose I turn over to you the distribution of time. I think the committee will be glad to sit here until 1 o'clock to listen to these gentlemen, and you may arrange the distribution of speeches and the distribution of time.

STATEMENT OF JOSEPH E. RANSDALL, REPRESENTATIVE FROM
LOUISIANA.

Mr. RANSDALL. I wish to state very briefly, Mr. Chairman, that we are here representing the entire section of the United States south of the quarantine line, and we feel that we are here representing as important a subject as your committee has to grapple with. We do not believe there is a subject before this committee which interests more people or in which the property interests involved are as great as in this question.

In the South it is estimated that there are 15,000,000 head of cattle, and all the authorities who have investigated the subject concur in saying that the price of our cattle is reduced from a quarter to a half a cent a pound because of the tick fever.

Mr. BOWIE. That is the price of the well cattle, those that do not have the fever?

Mr. RANSDALL. Yes, sir; it is the price of those we attempt to sell. The price as you know is made by the price in the best market. The best market with us is the Northern market, where there are so many more people; and whenever we attempt to send our cattle to the Northern market we are obliged to send them for immediate sale. Under the quarantine regulations they have to be slaughtered as soon as they reach the market, and in consequence of the forced sale of those cattle the price is reduced from a quarter to a half a cent per pound; and that fixes the price of beef cattle all over the South. So it is perfectly fair to say that the 15,000,000 head of cattle in the South are reduced in price from a quarter to a half a cent per pound.

It is also estimated that an immense number of the cattle die annually in the South of this fever. Many of them are depleted in general condition because of the ravages of the tick, so that when the winter season comes on they have no sufficient strength to resist the cold, and vast numbers of them die. The loss from death is very great. We have no accurate statistics on that, but I can state to you that in round numbers it approaches a good many millions of dollars every year. Some gentleman here will give you statistics. It has been estimated, gentlemen, in round numbers, and I do not think the estimate is at all exorbitant, that the direct and indirect loss to the South because of the cattle tick is fully \$150,000,000 every year. That may seem to you like a very large estimate, and as I know you gentlemen are not apt to take bare estimates without some facts to sustain them I am going to ask the gentlemen who follow me to give you some facts to sustain the statements.

One striking illustration, however, is this. A very practical demonstration was made by Doctor Dalrymple, who will address you. He is professor of veterinary surgery at the University of Louisiana. He found by a most careful investigation and experiments that the cattle tested by him in Louisiana, under the most favorable conditions where they were subject to this tick, weighed fully 200 pounds less when ready for the market than the same cattle would have weighed under exactly similar conditions of feeding, age, care, and everything of that sort in the North. So that the cattle prepared for market in the South, under the most favorable conditions, weigh 200 pounds less than they do when fattened in the North, and wholly, gentlemen, because of the tick.

You see how tremendously important that is to us. We are very anxious in the South to engage in the cattle industry. Many of us there would be delighted to go into it, and, gentlemen, many of us are going to be forced to go into it because of the ravages of the cotton boll weevil. We have not been able to successfully fight the cotton boll weevil. In the arid portions of Texas they succeed to some extent in making cotton with the cultural methods which have been advocated and advanced so scientifically under the auspices of

our Government; but in the river bottoms of Louisiana, Texas, and the other Southern States which are rapidly being invaded by the boll weevil we will be unable to raise cotton successfully, in my judgment, and we must engage in something else. Now, we know nothing better to turn our attention to than the cattle business, and we can not raise cattle successfully if we are to be bothered with the tick as we have been in the past.

We appeal to you, therefore, gentlemen, to help us in this matter. Our States are doing the very best they can, each in its own way; but you must remember that this is an national question. The National Government and not the States established the quarantine line. The National Government says when cattle shall be shipped, and where they shall be shipped, and how they shall be shipped. The States in the South can not regulate it. It is entirely beyond their control. It reaches beyond their borders and beyond their boundaries. The National Government should help in that as it should in all of these matters. We are not coming to you and asking you to furnish all the money to eradicate this pest. We are willing to help ourselves. We are going to spend and we are now spending considerable money in this matter, but we want the active cooperation and assistance of the Government in this great matter, just as we have asked it in other things.

Mr. SCOTT. Can you tell us offhand how much money Texas spends as a State by State appropriations in carrying on this work?

Mr. RANDELL. No, sir; I can not offhand. I know my own State. Louisiana, has appropriated \$50,000 for investigations of the crop-pest commission, and they are spending a large amount of that in this tick work. I can not answer for Texas.

Mr. BOWIE. This quarantine is 5,000 miles long. It is a much bigger thing than Texas.

Mr. RANDELL. Yes; it reaches from the Atlantic to the Pacific. It is a zig-zag line reaching from one side of the country to the other.

However, I do not wish to make a speech. I did not come here for that purpose. I will now introduce Mr. Clayton, of Alabama, to present the resolutions which were adopted by the conference held yesterday, which was attended by representatives from the entire South, and which was addressed by delegates from practically all the Southern States who are here representing the departments of agriculture of those States.

STATEMENT OF HENRY D. CLAYTON, REPRESENTATIVE FROM ALABAMA.

Mr. CLAYTON. Mr. Chairman, the conference to which Mr. Ransdell has just referred was composed of members of Congress from the States afflicted with the cattle tick, and gentlemen from the experiment stations in those States. I believe every State that is afflicted with the cattle tick had some expert representative here from their agricultural and mechanical college and their experiment stations, except Alabama, and I have letters and a telegram from Professor Dugger, who is the director in charge of the Alabama experiment station, and Doctor Carey, who is a veterinarian there, saying they could not be here, but they heartily indorse this movement and recognize the necessity for national aid in this good cause. This con-

ference, composed of the gentlemen just referred to, yesterday afternoon took the following action:

At a meeting of the committee appointed by a conference of gentlemen interested in the extermination of the cattle tick, Doctor Morgan, of Tennessee, was made chairman and Mr. Flood, of Virginia, was made secretary.

The following resolution offered by Representative Clayton, of Alabama, and amended on the motion of Representatives Livingston, of Georgia, and Elerbee, of South Carolina, was adopted:

"Resolved, That this committee ask the Committee on Agriculture of the House of Representatives for an appropriation of \$200,000, or so much thereof as may be necessary, for the purpose of experimentation, demonstration, and extermination of the cattle tick, and for the further purpose of narrowing the cattle quarantine and eventually rendering such quarantine unnecessary."

Mr. Ransdell has already explained the view that those of us from the South, who have to contend with this pest, take of it. We do not think it a local question. We think it is a national question. Indeed, anyone familiar with the recent legislation of Congress is bound to concur in the opinion that it is a national question. You recollect that when the question was first raised in Europe against American cattle investigation was had, and it was ascertained what the cause of this fever was. You also recollect that the Bureau of Animal Industry was created and clothed with authority, and how that authority has been increased from time to time, and how—at the last session of Congress, I believe it was—we still further broadened the scope of the Department of Agriculture in the manner of establishing and regulating this quarantine line. Anyone familiar with the map prepared by the Department of Agriculture can see that the quarantine line runs through the southern portion of Virginia and the northern portion of North Carolina, South Carolina, Georgia, Alabama, Mississippi, Arkansas, Indian Territory, through Oklahoma, through the major portion of Texas—most of Texas is included in the quarantine—and on to southern California.

The importance of the question has been stated by Mr. Ransdell. The idea of its being a national question and not a local question, and the idea of its importance to the entire country has been well stated by him. These gentlemen who come here from the various experiment stations throughout the South are practical men. They have been engaged in the practical work of experimenting demonstrating the proper means and methods for the extermination of this admittedly great evil, and the Members of Congress have agreed among themselves that these gentlemen should be heard to-day. They know more about it than the rest of us, and I believe that they can impress upon you, as they did upon us who were present at the conference yesterday evening, not only of the wisdom, but the absolute necessity for a Federal appropriation in this matter, where Congress has already assumed jurisdiction.

Mr. RANSDALL. Mr. Chairman, I would ask Dr. Tait Butler, of North Carolina, to address the committee now. As there are at least six or seven gentlemen who would like to be heard, I would suggest that each gentlemen should not take over twenty minutes.

STATEMENT OF DR. TAIT BUTLER.

Doctor BUTLER. Gentlemen of the committee I would say that I do not want to take much of your time, and I shall certainly get through in twenty minutes. I would say, further, that I would prefer to speak on this subject in reply to such questions as the members of the committee may wish to ask. I feel that I can perhaps come nearer the information that would be of most benefit in that way than I can by speaking in a set way.

The CHAIRMAN. I notice in a bulletin from your experiment station that you succeeded in exterminating the tick from ten or twelve counties in North Carolina. How did you do that? That will start you in your statement.

Doctor BUTLER. Yes, sir. In the first place we took those ten or twelve counties that are immediately south of the Federal quarantine line, and we drew a second line around those, below, to prevent their reinfection from infested sections still farther south. That was necessary before we could begin to do any work.

Then we employed inspectors to go through those counties, making a farm to farm canvass, and locate the infection, that is, to find out what farms were infected with the ticks. Allow me to digress right here to say that in the greatest part, at least, of the quarantine section, all the farms are not infected. In some sections not half of them are affected. In some sections not more than one-tenth; yet the other nine who have no infection on their places are made to suffer because of this quarantine line.

Now, we put these men to work to find where the infection is. When we find the farms that are infected, then we have authority given by our State legislature, through the board of agriculture, to quarantine those farms. We say to the man, "Until you get rid of the ticks you shall not bring any cattle onto this farm or take any that are already there off of it."

The CHAIRMAN. You have power to enforce that, have you?

Doctor BUTLER. We have power to enforce that; yes, sir. Most of the men, as soon as we do that, get rid of them. We go further and tell a man how he can get rid of them and we take special pains, spending time with him, to tell him how he can exterminate these ticks on his place. Then nine men out of ten will go to work and do it. Sometimes they do not. Then we just have to keep them locked up there until they do.

When that does not do, then we are obliged, when we get all of the tick infested farms in a county clear, except, say, eight or ten or twelve, to keep that entire county south of the quarantine line. That is required by the Federal Bureau of Animal Industry. It is necessary because the ticks are scattered over the county. Then in order to get rid of those ten or fifteen we have to frequently make application to the cattle direct, in the way of dips, to kill the ticks. That is the way we do it. It takes money to employ those inspectors. It is a big job to run all over that county, even, and find the infected farms.

The CHAIRMAN. How much does your State spend for this purpose?

Doctor BUTLER. The State is spending, including my salary, as I spend part of my time supervising it, between \$6,000 and \$7,000 a year.

Mr. LEVER. How do you pay these inspectors?

Doctor BUTLER. We pay these inspectors by the day. I would say, following that question, that to clear these eleven counties, and parts of two others, charging up the part of my salary that is devoted to that work, has cost the State of North Carolina not to exceed \$15,000.

Mr. LEVER. How many counties have you in the State below the quarantine line?

Doctor BUTLER. Seventy-one counties below the quarantine line.

Mr. BOWIE. It has cost you an average of about \$1,500 to the county?

Doctor BUTLER. Not more than that.

Mr. BOWIE. Do you think that is promising?

Doctor BUTLER. Yes. In our State I have yet some 25 or 30 counties. There are some counties that I can not clear up that cheaply, but I have still 25 or 30 counties; and spreading out \$1,500 to the county over three years or four years at the most, I can clean up those 25 or 30 counties. But I want to bring in this point: As we clear up those counties we are undercutting Virginia, as it were. We have infested territory above us, we have infested territory below us, and it is a very expensive matter to maintain these quarantine lines. This is already a national question, but if the national bureau had charge of it Virginia would be doing work at the same time we are, and it would save this difficulty.

Mr. LAMB. Have you been in any county of Virginia?

Doctor BUTLER. I have been in some of them; yes, sir.

Mr. LAMB. I mean with this work.

Doctor BUTLER. No; I am working for the State of North Carolina.

Mr. LAMB. I would like to hear you on the subject of change of pasture, which I heard you speak of on yesterday evening. I would like to have it go into this record.

Mr. BOWIE. Right on the point you have just made, I want to get in here this fact, if you will excuse me, Mr. Lamb.

Mr. LAMB. Certainly.

Mr. BOWIE. The difficulty, as I understand it, with your State quarantine regulations, is that you have States to the north of you and to the west of you and to the south of you, and counties to the east of you that have different regulations?

Doctor BUTLER. Yes, sir.

Mr. BOWIE. And the only way to get uniform regulations is through the National Government?

Doctor BUTLER. That is it exactly.

Mr. BOWIE. It is absolutely impossible to get uniformity through State action?

Doctor BUTLER. Yes, sir.

Mr. LAMB. I understand, Doctor Butler, that another speaker will take up the pasture question, so you need not go into that.

Doctor BUTLER. I want to go back to a question touched upon by Mr. Ransdell, because I have had experience in the effect of the quarantine on the cattle industry in the South. Mr. Ransdell has told you that every animal shipped out of the South suffers a depreciation of a quarter or half a cent a pound. I spent some time working for the Bureau of Animal Industry in the stock yards, where these southern cattle were set aside. That is, they were obliged to

go to a separate part of the stock yard for sale. I have gone, day after day, from one section of the stock yards to another, and while I am not an expert judge of cattle, in one sense, still I can tell fairly well the value of cattle, and I have had commission men tell me. I have had sellers tell me, and I have seen with my own eyes, that the cattle in the quarantine pens did sell cheaper, although of the same value, and they will continue to do so just so long as buyers are human. When they know those cattle must go immediately to slaughter or must go back home, when they know they have us right in their hands that way, so long as buyers are human we are going to suffer from it.

Again, I took a carload of cattle from north of the quarantine line that never had had a tick on them. I took them south of the quarantine line, but of course, did not take them where there were any ticks. I was careful about that, but I took them south of the quarantine line, fed them, and shipped them to just north of the quarantine line again, and the best information I could get from the Federal inspectors and from the commission men was that at the very least estimate those cattle sold for 30 cents a hundred less than they would have sold for had they gone in the free section of the yards. Gentlemen, that meant to me \$72.18 on that one carload. We can raise cattle in the South, we can produce feed for cattle in the South; but, gentlemen, we can not produce cattle in the South under that kind of a handicap. It is too much of a handicap.

Wherever that quarantine line runs, it does more harm than that to the people immediately adjacent to it. I went on the 6th day of June, last year, to one town just north of the quarantine line and saw a dry Jersey cow sell for 4 cents a pound for beef. I went 23 miles away from that on the same day, but on the other side of the quarantine line, and saw just as good an animal sell for 2½ cents a pound. Why? Simply because the owner could not drive her to Asheville, a better market.

I want to say further that the Federal authorities put this quarantine line across this country, which was right. They were justified in doing it. It was right to put it there; but I say that if it is right to put that quarantine line there, then it is right to help us to get out from under it. They ought not to put a fence around us and say, "Stay there now." We ought to have Federal help, because it extends through too many States and it is too big a problem for the individual States to handle.

If there were no further reason under the sun for exterminating the tick, the matter of the Federal quarantine would be enough. It would pay amply to spend millions and millions to get rid of this quarantine line, if that were the only objection. But again, if the mere fact that if these ticks get on the cattle and suck the blood for months in the year were the only reason, it would be sufficient to justify us in exterminating them. We do not hesitate to exterminate lice and other parasites when they get on our cattle, and we believe it pays to do it. These ticks could be exterminated as easily, and therefore it will pay for that reason alone. The third reason why we should exterminate the ticks is that more cattle die in the quarantine country per year from tick fever than die from any four or five other diseases you can name.

You can name four or five of the common diseases in the South, and then I will put up a case of death from tick fever for every one. You ask, Why is that? Simply because in the greater part of the quarantine section of the South not one-half of the farms are infected, and there is where the trouble comes. An animal raised on a North Carolina farm that is free of ticks is just as susceptible as a cow raised in New York State, if she is raised free of ticks until she is matured, and not one-half of the cattle in North Carolina every carry ticks. Therefore, when neighbors mix their cattle, when people from different counties mix their cattle, we have tick fever, and we have more cattle dying from it than any other four or five diseases.

Mr. BOWIE. How many States are affected by this?

Doctor BUTLER. There are 13 States entirely or partially under the quarantine.

Mr. BOWIE. That includes the territory of Indian Territory and Oklahoma?

Doctor BUTLER. No; I counted those as one State. Perhaps I was a little premature, but I counted them as one State.

Mr. BOWIE. I count 13 without it. Is not Kentucky in the quarantine section?

Doctor BUTLER. Kentucky is partially included, but that is a modified quarantine. They are permitted to get them out on inspection during the entire year, and we do not call Kentucky under quarantine, although there are two counties there in which cattle can only get out on inspection. There are 14, including that.

Unless there is some further question, I am through.

The CHAIRMAN. What is the altitude of the counties in which you have practically exterminated the tick?

Doctor BUTLER. We have exterminated the tick in counties not more than 400 or 500 feet above sea level. Then we have done work in counties that were 1,500 and 2,200 and 2,500 feet above the sea level. Henderson County, when I went to the State of North Carolina four years ago, was one of the worst infected counties in that section of the State, and it will range from 1,500 to 2,200 or 2,500 feet above sea level. They stayed there. They lived there from year to year; and they have been living there I do not know how long—as long as anybody remembers.

The CHAIRMAN. Have you cleaned up Henderson County?

Doctor BUTLER. Henderson County is cleaned up; yes, sir. It is one of the eleven counties that I counted.

The CHAIRMAN. Are these counties contiguous?

Doctor BUTLER. Yes, sir. I would say that I have a little literature, and if anybody wishes me to do so, I can show where those counties are located. I believe you had one of those circulars, Mr. Chairman.

The CHAIRMAN. Yes.

Mr. REDDING. Doctor, will you explain to us just how you do this work?

Doctor BUTLER. Our plans are merely these. There are three methods by which we work. The first one, a most serviceable and most useful method, is what we know as the starvation method of destroying the tick. We aim to take the cattle in our State out of the pasture by the 15th of August or the 1st of September and run

them on the grain fields or the cotton fields, or wherever we can. Where we can not do that, we tie them out where there are only one or two cows, and in some way aim to clear the pasture by the 1st of September anyway, and we prefer the middle of August. Then by the next May, by the time we need the pasture again, that pasture is free of ticks. That has been so in 98 per cent of our experiments, and we have had hundreds of them.

The CHAIRMAN. You claim that a tick will not live over the winter off the animal?

Doctor BUTLER. He might live over the winter off the animal, but he will not live in our State that length of time. In certain sections he would live longer, perhaps. The point is this. He will live off the animal in summer not more than two or three months possibly, and in winter not more than five or six or seven months. If he does not get on the animal he will die in that length of time.

The CHAIRMAN. He will live longer in winter off the animal than in summer?

Doctor BUTLER. Yes; if the winter is not cold enough to freeze him up and kill him.

The CHAIRMAN. What do you mean by cold enough?

Doctor BUTLER. It will have to get down to probably 10° or 15° above zero, anyway, to do it. He lives in a quiescent state.

The CHAIRMAN. In a way he hibernates?

Doctor BUTLER. Yes; in a sense, but as a rule the way the tick goes through the winter is in the egg state and not the young-tick state. The way we get him is this: The cattle are taken out on the 1st of September. Then all female ticks that have dropped previous to that time will have laid their eggs and the eggs will have hatched before winter comes. If we left the cattle in there until the 1st of November the eggs that the female ticks have laid would not be hatched out, and the eggs would go through and hatch out in the spring.

Mr. SCOTT. When the eggs hatch out in the spring, is the natural period of the tick's life only about two or three months?

Doctor BUTLER. He does not hatch out in the spring until the weather begins to get warm, and then the hot weather will kill him in two or three months.

Mr. SCOTT. He starves to death, does he?

Doctor BUTLER. He starves to death; yes, sir. You must keep him off of horses and mules also. You can run sheep, hogs, and goats on that pasture, but you must not run horses or mules.

Our other plan is to take another pasture. If a man can not make another pasture or take his cattle out, we run a fence through and put a board tight on the ground in the center. I have never had ticks get over a rail fence or a board on the ground. I prefer to put two wire fences and leave a space between them, and take the cattle out of one pasture about the 1st of September and keep them out until the next spring and then put them back in there and leave the other half vacant from the spring until the 1st of September or the 1st of October. Then you have got all the pasture clear. Of course, you must avoid using the same pasture.

There is one other method we use, which is a modified form. There is a method of killing the ticks on the cattle by dipping the cattle or applying applications. The cattle are owned in such small numbers on such small farms in our country that we can not establish dipping

vats, but we make a direct application of grease to the cows on those small farms. That is our other method, but that has to be thorough. It has to be kept up for months, and is the least valuable of the methods. We find a change of pasture will invariably do it, if ticky cattle are not run back in the spring.

Mr. SCOTT. What is the expense connected with what you claim to be the best method?

Doctor BUTLER. The expense in our State has been about \$1,500 a county to find out which farms were infected and to induce the people to practice it.

Mr. SCOTT. The cost of inspection and of disseminating the information?

Doctor BUTLER. That is it, and maintaining the quarantine. That has been our cost.

The CHAIRMAN. Doctor, I can readily see that your methods are very applicable to fenced-up country, and particularly all through, we will say, east of the Mississippi, where, as a rule, the holdings of cattle are in small numbers; but how would your methods apply to Texas, where the range is unfenced and where the cattle are in thousands together?

Doctor BUTLER. I want to be perfectly fair to you gentlemen, and I will make this statement frankly. Under the present conditions there may be certain sections where our methods, as we now understand them, would not be applicable. There may be sections where the cattle run at large where present methods may not be applicable; but we can find the correct methods if we go at it right, probably. I would suggest, although I have had no experience on those big ranges, that their methods must be either by dividing the big pastures, or, if that is not practicable, then establishing dipping stations or dipping vats to dip the cattle, or, in other words, use that first method that we spoke of, the application of materials direct to the cow to kill the tick.

A MEMBER. Those big pastures are all subdivided.

Doctor BUTLER. Then if we would make those changes to conform to what we have found the conditions to be, they can get rid of the ticks. I have known people to change pastures and say, "We can't get rid of the ticks that way," but they will change every two months. That will not do. If they can make those changes—and I know what you say about some of them is right—they can get rid of them.

The CHAIRMAN. In a fenced country, where you have a rotation of crops, it is easy enough to abandon a pasture for pasturing purposes for two or three years, or any time you please, but when you get on the great ranges it is an entirely different proposition.

Doctor BUTLER. I think it will have to be done through the rotation, or the dipping method. I will say that we have in the South, in nearly every State, a whole lot of territory which is just in the condition under which I am working. As we go farther south with that quarantine line, and they see the conditions that are coming, they are going to abolish the no-fence law and they are going to fence pastures.

They are doing it right along in our State. We can not exterminate the tick in a year, I grant you, but if we exterminate it in one single county we have done it at a profit, and we can just gradually go on till we do get rid of them entirely.

I want to say, gentlemen, in conclusion, that this matter of tick extermination is a vital question to the South. Before you solve the cattle industry you have got to solve the tick question, and before you solve the agricultural problem of the South you have got to solve the cattle problem. There never yet was a country that was permanently successful in agriculture that did not have in its system a large part of animal husbandry. We can grow the cattle, but we can not grow them under this kind of handicap. Help us to get out. You put the quarantine line there. Help us to get out from under it. We will do our part. We are ready to do it.

Mr. RANDELL. Mr. Chairman, Doctor Melvin, of the Department of Agriculture, can probably tell us something about the methods applicable to the big ranges.

The CHAIRMAN. Follow your own order, Mr. Randsell.

Mr. RANDELL. Doctor Melvin, will you tell us something about how the methods are applied on those ranges for the extermination of the ticks?

STATEMENT OF DR. A. D. MELVIN.

Doctor MELVIN. The extermination of ticks on the range has never been largely attempted, but a demonstration was made several years ago in Texas which would seem to show that it can be done. This demonstration was made in Texas on a pasture of six sections. The cattle were dipped in crude oil late in the fall, and again dipped in the spring. This fall dipping destroyed the ticks that were on them then, and the spring dipping destroyed any ticks which got on them after that time.

These cattle were inspected late the following summer, and they were found to be entirely free from ticks. This, I think, shows that it can only be applied on a larger scale, but there must be, of course, some restrictions to the cattle. They can not run at large; but Texas is nearly all under fence. Of course, some of the pastures are tremendously large, but there is some control through fences.

I might remind the committee that it was on account of this Texas fever that our market in Germany in live cattle was lost. That is the excuse that they made for placing an embargo on cattle from the United States.

Mr. BOWIE. That, then, affected the whole cattle industry in the United States?

Doctor MELVIN. Yes, sir.

Mr. BOWIE. Then, also, to the extent that the cattle industry is affected in the South, the people who consume cattle products are affected all over the United States. It becomes a national question by cutting down the supply, does it not?

Doctor MELVIN. Oh, yes; it is a national question to-day, as we have to maintain this quarantine. The maintaining of these quarantine measures costs the Government to-day between \$50,000 and \$60,000 a year. Of course, if it were possible to exterminate the tick, this would be no longer necessary.

The CHAIRMAN. Does the cattle tick exist in Mexico?

Doctor MELVIN. In sections of Mexico; yes, sir.

Mr. SCOTT. Have they ever done anything toward an attempt to exterminate it?

Doctor MELVIN. No, sir.

The CHAIRMAN. Are there any ticks in Cuba?

Doctor MELVIN. Yes, sir; in Cuba, in Porto Rico, and in the Philippines.

Mr. LEVER. Have you made any estimate of the total amount of money it will be necessary to appropriate in order to exterminate the tick-infested regions of the South?

Doctor MELVIN. I do not think it would be possible for anyone to make a fairly accurate estimate at this time. The work will necessarily have to continue for a number of years, and it should be approached gradually in order that the feasibility of extermination—

The CHAIRMAN. May be ascertained?

Doctor MELVIN. I think it has been ascertained, but to show the cattle raisers that it is practicable and can be done. It will be necessary to get the cooperation of the stock owners to make this movement successful, and it will also be necessary to have specific State legislation on the subject, so that the Federal Government can cooperate with the State; and when this has been accomplished then we can go ahead. But my idea would be that the extermination has to be commenced on a comparatively small scale and demonstrated to the stock owners that it is possible. In that way we can secure their cooperation.

Mr. LEVER. How much money can you use in the next fiscal year, for instance, in your bureau for this purpose?

Mr. FIELD. And on what line would you suggest proceeding as being the most practicable?

Doctor MELVIN. That would depend considerably upon the number of States that are now ready to cooperate and have sufficient laws which would enable them to cooperate. I think, from the present indications, to make a fairly good start for this year, we should have in the vicinity of \$100,000. Of course this movement has grown so rapidly that we have not been able to anticipate it to the full extent.

Mr. SCOTT. Just what do you mean by saying this movement has grown so rapidly? Do you mean that the tick has been extending so rapidly over the infested region that an emergency is presented right now?

Doctor MELVIN. No, sir; the tick is practically confined to the same districts in which he has been for a number of years, but this crisis, if I may use that term, seems to have been brought about through the destruction wrought by the boll weevil. This has cost these people—

The CHAIRMAN. You mean the abandoning of the one-crop system?

Doctor MELVIN. Yes, sir; they have had to turn their attention to live stock, and those who have been engaged in it extensively see the handicap under which they are placed.

Mr. SCOTT. I asked the question for the purpose of drawing out the information as to whether or not the tick, that we all know has existed in the southern portions of the United States probably from the inception of the cattle industry there, is spreading so rapidly as to make an emergency?

Doctor MELVIN. No. As I said, the line is practically the same. It has extended in some slight directions and has been exterminated in other directions.

Mr. SCOTT. So that it is not really any worse now than it has been for the past fifty years?

Doctor MELVIN. We do not know about fifty years ago.

Mr. LAMB. Of course, because cattle have been shipped, and the fever has been extended all over that territory.

Doctor MELVIN. Our records go back to about twenty years ago.

Mr. SCOTT. Is it any worse now than it was then?

Doctor MELVIN. No; I doubt whether it is. I think it is practically the same. The line has been maintained, and in some sections, as Mr. Butler stated is the case in North Carolina, has been shoved back quite considerably.

Mr. SCOTT. Is it not a fact also that the discontinuance of trailing cattle from the south to the northern market, which came at the construction of railroads, has restricted the territory in which the tick does its work?

Doctor MELVIN. It has restricted the losses among northern cattle on account of this tick, but it has not restricted the area that the tick naturally inhabits. The losses through the quarantine regulations of the Department have been very much reduced for the last number of years, but the area itself is practically the same.

The CHAIRMAN. I think, undoubtedly, Doctor, the dipping you have done has reduced the danger a great deal. In fact, it has reduced it to a minimum as far as you have gone, has it not?

Doctor MELVIN. That was merely a demonstration. It was not with the object of eradicating it.

The CHAIRMAN. You are dipping a great many cattle which come north, now, are you not?

Doctor MELVIN. We are dipping nearly all that are going from Texas into the Osage country and the Indian Territory. Last year 57,000 head of cattle that went into the Osage Nation were dipped.

The CHAIRMAN. Were there any ticks in that country before?

Doctor MELVIN. Yes, sir; there are some there now, but they are not scattered over the whole of that country.

The CHAIRMAN. Will not these cattle that are going there be reinfected?

Doctor MELVIN. They will, in some parts, but not in all parts. That country has recently settled up largely by farmers who brought in a few cattle each, and these came in principally from the north and were susceptible. The Texas cattle were brought in there and distributed over the whole of that country, and nearly all of those cattle were exposed to the disease, and the losses were very great. By dipping the cattle we removed probably 75 per cent of that danger, and perhaps more than that.

Mr. LEVER. Doctor, in answer to Mr. Scott, I believe you said that in the last twenty years there had not been any great increase in the area of the Texas fever tick.

Doctor MELVIN. Yes.

Mr. LEVER. Twenty years ago the German Government had not placed any embargo on our cattle products, had it?

Doctor MELVIN. It was about twenty years ago that this line was first established.

Mr. BOWIE. The line has been practically there all the time?

Doctor MELVIN. Since then; yes, sir.

The CHAIRMAN. I suggest now, Doctor, that you give way to the gentlemen who have come to attend this meeting. We can always have you.

Doctor MELVIN. Certainly, sir.

Mr. RANDELL. I will next introduce Dr. W. H. Dalrymple, professor of veterinary surgery at the University of Louisiana.

STATEMENT OF DR. W. H. DALRYMPLE.

Doctor DALRYMPLE. Mr. Chairman and gentlemen of the committee, as I understand it, it was imperative for the national Government to place a quarantine for the protection of the greater part of this country against the ravages of tick fever, fever produced by a transmission of an organism by the tick. Our object to-day is to get that line down to the Gulf of Mexico and to the Rio Grande. That is our object, and we want to do what we can ourselves, but we want you to help us.

Nothing has been said here about the life history of the organism, and I think it is altogether germane, if you will listen to it, because there is so much to understand about this question that the ordinary individual not giving it any consideration is not at all familiar with it.

I presume it is quite fresh in the memory of everyone of you what we had to do in Louisiana with regard to yellow fever last summer. Texas fever in cattle is almost a parallel case with yellow fever in human beings. The organism of yellow fever has never been identified. Still, by its behavior, it is known to be a protozoan, which is one of the lowest forms of animal life. So is the cattle-fever germ. The ordinary bacteria of infectious diseases, as we know them, do not belong to the animal kingdom at all. They belong to the vegetable kingdom. What I want to make out of that is that the animal germs can not exist off the bodies of the two hosts which harbor them or which they require for the completion of their life cycle. Consequently the war was made in Louisiana against that one species of mosquito, the *Stegomyia fasciata*, to destroy the least valuable of the two hosts and break the chain, the cycle, in the existence of the germ. The idea now is, therefore, to kill the tick, the least valuable of the two hosts of the Texas-fever germ, which are the bovine animal and the tick, with the exception of horses and mules. The tick will live on horses and mules, but it has been proved that the blood of the horse and mule will not sustain the organism of the Texas fever, so that a cattle tick getting onto a cow after being on a horse will not transmit the organism.

Another point is that there is a great number of species of ticks. Even in our own country, where we are right amongst them, the people have no real rational conception of this fact. In other words, a tick is a tick to them. I believe that the Department of Agriculture gives out a report of about eight species of ticks, if I mistake not. That is done for the benefit of the inspectors, in order to be on guard against the various ticks, but out of all of them, only one of them will transmit the organism of Texas fever, so far as we know, and we in Louisiana have at all events tested five varieties or species of the tick.

To show you the density of ignorance that prevails even amongst our own people, I had a letter from Texas not very long ago in reply to an article that I had in one of the papers in regard to Texas fever. It was an excerpt taken from a bulletin, that is probably on the table here, that we got up in Louisiana, and one of the range men there took issue with me on the question of female ticks. He said he was 63 years old and he had known old, old men in Texas, and they never believed there was such a thing as a female tick, that ticks never mated, and that they never laid eggs. That is what they know in some parts of the South about the tick. I was asked to reply to it, not because it was worthy of it, but because 75 per cent of that density of ignorance prevailed among the range cattlemen of Texas in regard to the life history of the tick, and those are the people we must get interested in the matter before we can engage in a thorough uniformity in campaigning against the tick.

Mr. LEVER. How many eggs does one of these ticks lay?

Doctor DALRYMPLE. The female lays from 1,500 to 3,000 eggs.

The field has been so well covered by Doctor Butler and Congressman Ransdell that it is almost impossible for me to bring out any salient point in addition to what they have said.

Mr. SCOTT. Before you leave the life history of the tick, can you not give it to us in a few sentences?

Doctor DALRYMPLE. I was referring to the life history of the organism of Texas fever.

Mr. SCOTT. Do you not think the life history of the tick ought to go along with this?

Doctor DALRYMPLE. I think you can get that better from my friend, Professor Morgan, who has made a thorough study of it. He is an entomologist.

There is no doubt, it seems to me, that this is a national question. I remember being invited to go to Nebraska to say something about the possibility of the markets of the South for the pure-bred cattle of the West. That is a great question. I believe it affects the northern breeder almost as much as it affects the southern man who is raising cattle; perhaps not to such an extent, but it deprives them of the cattle except animals for immunization. We thought we had obtained an immunization from Texas fever, except under very powerful conditions of infection, but that does immune against the tick. That simply renders immunity against the ravages of the germ itself. I will say I have myself immunized four or five hundred pure breeds of Louisiana, and I question to-day whether 25 per cent of those are alive. They did not die from Texas fever, but from the ravages of the tick as a parasite. Their systems were depleted and, although they may be alive to-day, they are probably largely skin and bone, unless they have been well attended to, and it interferes with the potency of animals for breeding.

A great many of our breeders in Louisiana have spent large sums of money for this purpose. There is a gentleman here to-day who has, I suppose, spent \$10,000 in pure-bred Shorthorns to try to go into the industry there and breed the animals, but it is an impossibility. He can rid his pastures of the ticks as a private individual, but he is susceptible to be infected from other places. Our streams of water are the media by which the ticks may be carried. So if a man rides

his place of them below and there are infected places above, the water courses are media for transferring the ticks from one place to another, and the man below has no guarantee that to-morrow he will not get the infection from above.

And another point is this. In the South we can grow the finest kind of products for animals. Our cotton-seed mills, our rice factories, etc., produce the finest kind of feed. Immigration is looking southward. We need immigrants to develop our country. A great deal of our prospective immigration is from the West—of men who have engaged in the cattle industry. I get letters from all over that country asking about live-stock diseases and the possibility of raising animals in the South. It is hard for me to say that the conditions are as good as they are in the North or in the West, where there is no tick, because we know as an absolute fact from daily experience that the tick is the great incubus upon our cattle industry in the South. It is against the development of our country from an agricultural standpoint. We can not compete in the exhibitions of the North and West.

I was up at the live-stock show in Chicago and had five of our university students with me. We could not compete there with the Iowa boys and the Nebraska boys, because our cattle are quarantined against on account of the tick. It is against our educational facilities. If you are in live stock, in agriculture, in animal husbandry, taking it from all standpoints, it is the greatest embargo to-day upon southern progress, because I believe the South is now dependent upon its agricultural resources for prosperity, and we want every assistance to help build it up.

We have in Louisiana a great many parishes that are out of the tick-infected territory. Along the Gulf of Mexico we do not have any ticks. The cattle sold by those people to people farther up the State would get Texas fever and die just as if they came from New York, because they have been reared in a place where there have been no ticks, and consequently were never inoculated in baby calfhood, as they generally are. We can help ourselves, and we want to help ourselves, and we are doing it.

THE CHAIRMAN. What are you doing exactly?

DOCTOR DALRYMPLE. We have a crop pest commission created by the legislature, and this matter of ticks and animal life comes within the province of that crop pest commission. We have to-day \$50,000 belonging to the crop pest commission, and we can use some of that in the eradication of the ticks.

THE CHAIRMAN. Have you used any of it?

DOCTOR DALRYMPLE. Yes, some of it. But a great deal of it has been used in fighting the boll weevil and the San José scale that is down there now.

THE CHAIRMAN. What have you done along the tick line?

DOCTOR DALRYMPLE. We have not done a great deal, except in a small way. We have done something in education, principally. That is the greatest part we have done; but we are prepared to do it, and we simply want your help.

MR. BOWIE. Is that \$50,000 an annual appropriation?

DOCTOR DALRYMPLE. Professor Morgan, the secretary of the crop pest commission, says it is available right now.

Mr. RANDELL. You have published a great many bulletins on the subject of ticks, have you not?

Doctor DALRYMPLE. Yes. We have the benefit of the assistance of the crop pest commission, and the stations help us as far as they can.

Mr. LEVER. Your plan is to have the Federal Government assist?

Doctor DALRYMPLE. To have the Federal Government assist us, yes. We want the assistance of the Federal Government.

The CHAIRMAN. If we assist you, you will not stop supporting yourselves?

Doctor DALRYMPLE. Not at all.

Mr. LEVER. Your committee passed resolutions yesterday asking for \$200,000 for this year?

Doctor DALRYMPLE. Yes.

Mr. LEVER. Do you think the Bureau of Animal Industry has the machinery now with which to advantageously spend that money for the current year?

Doctor DALRYMPLE. I will have to refer to the Department to get an answer to that question. Possibly you would have to add to it.

Mr. LEVER. We want to get something definite here, you understand.

Doctor DALRYMPLE. Yes; I understand that. Possibly you will have to add to it. As Doctor Melvin says, you will have to go on cautiously. This is a big question.

The CHAIRMAN. You go on the principle that if you ask for a whole loaf you may get half a loaf?

Doctor DALRYMPLE. No; I think the amount that has been asked for is a very conservative amount.

The CHAIRMAN. Two hundred thousand dollars?

Doctor DALRYMPLE. Yes, sir.

Mr. RANDELL. I would like to know whether there is any reason that you know of why the Bureau of Animal Industry should not establish some inside quarantine line so as to save that ten or twelve thousand square miles on the Gulf?

Doctor DALRYMPLE. It would give great relief to those people who are in a large area of country where the ticks do not exist. They do not get any benefit at all from that, although they are free of ticks.

Mr. RANDELL. That is a conservative estimate, is it not—ten or twelve thousand square miles?

Doctor DALRYMPLE. Yes, sir; there is quite a large area there in the southern portion of the State.

Mr. FIELD. Is that due to the atmosphere?

Doctor DALRYMPLE. It is due to cultivation, and so on. Of course, we have large cultivated areas where we do not have ticks.

I expect the eyes of the world are on this matter, because it is not confined to America. The British Government is fighting it in South Africa and in Australia. I hope this recommendation will be favorably considered, as this Government generally takes the lead in such matters. I have spoken in an extemporaneous manner and I do not know that I have covered everything. I will be glad to answer any questions.

Mr. ROBERTSON, of Arkansas. Is there any fever among the cattle without the ticks?

Doctor DALRYMPLE. No; it is a specific fever.

Mr. ROBERTSON, of Arkansas. I would like to know something about the identity of this particular tick. How are you going to recognize this tick?

Doctor DALRYMPLE. You can recognize him just as you can recognize one breed of cattle from another.

Mr. RANDELL. In answer to your question, Mr. Robertson, I will ask Doctor Morgan to explain that. In the meantime, however, Mr. Thomas wishes to address the committee for one minute.

STATEMENT OF HON. CHARLES R. THOMAS, REPRESENTATIVE FROM NORTH CAROLINA.

Mr. THOMAS. Mr. Chairman and gentlemen of the committee, I merely wish to call the attention of the committee to a letter of the commissioner of agriculture of North Carolina, Hon. S. L. Patterson, which was printed in the Record of January 26, 1906. The letter is so full and so comprehensive that while Doctor Butler and Doctor Kilgore, and a very distinguished gentleman from the board of agriculture of North Carolina, Major Graham, are here, I want the committee to also take into consideration the contents of that letter.

There is one thing to which I want to call especial attention that has not been touched upon. That is the commercial value of this proposition of national aid. Mr. Patterson estimates the number of cattle in the tick section of the United States, which includes the whole southern country, except Virginia, Tennessee, Oklahoma, and Indian Territory, at 97,000,000. He also estimates that the increased value which would result from the use of the appropriation of \$200,000 in the tick-infested country throughout the South would be \$1 per head, or \$97,000,000, and that the State of North Carolina would be benefited to the extent of \$10,000,000 by the increased value of cattle of \$1 per head.

The CHAIRMAN. I suggest, Mr. Thomas, you furnish the stenographer a copy of the letter, so that we may have it printed in the proceedings.

Mr. THOMAS. I wanted the stenographer to take down what I had to say, and also to take this letter. It is included as a part of my remarks in the Record of January 26.

The letter referred to is as follows:

NORTH CAROLINA DEPARTMENT OF AGRICULTURE,
Raleigh, N. C., January 23, 1906.

HON. CHARLES R. THOMAS,
House of Representatives, Washington, D. C.

DEAR MR. THOMAS: An effort will be made to secure the cooperation and aid of the Federal with the Southern State governments to exterminate the cattle tick.

Cattle raising must play a far more important part in the future in our southern farm economy than it has done since the war. The tick is its greatest menace.

This department, taking the lead in this, as it has done in several other measures, has secured the exemption of all the transmontane counties and several of the piedmont counties from the restrictions of the Federal quarantine laws. Getting away from the cattle mountain ranges, some of which have been badly infested with ticks, and reaching the stock-law section of the State, we will make rapid strides eastward. We will soon reach Mecklenburg, Rowan, Davie, Yadkin, and Stokes, and every subsequent year will mark a substantial addition of territory to the exempted area. But it is an interstate question, and the Government ought to give its aid. As our exempted territory extends eastward,

longer stretches of Virginia and South Carolina border lines are left exposed, unless these States shall keep faster step in their respective territories.

Let me give you just a few figures:

According to the last report of the United States Department of Agriculture there are in the Southern States, exclusive of Virginia, Tennessee, Oklahoma, and Indian Territory, 97,474,876 cattle—that many cattle subject to quarantine restrictions, except in those localities where the tick has been eradicated.

Suppose these cattle averaged 450 pounds in weight—low estimate, is it not?—and suppose the increase of value consequent upon the extinction of their deadliest enemy is placed at only one-fourth of a cent per pound—another too low estimate—the increase of value would at once amount to \$109,659,235. Or suppose we say, in a rough way, that a value of \$1 per head will follow, and we add to our cattle's worth \$97,474,876. But this is not all or the greatest benefit to come.

It has not been safe to import clear-blooded cattle into the tick region of the South. They died. With the tick removed, cattle could be transported here from any section of the world in safety. A new impetus would be given the industry, such as has not been known for many years, if ever before, in the history of the South. More cattle of good breeds would be introduced, feeders would utilize their own rich cattle foods, such as pea-vine hay, corn stover, cotton-seed meal and hulls, and our big fertilizer bills might be reduced by the substitution of increased savings of homemade manures.

All this can be done. Secretary Willson is in favor of the bill. I know you will give us your aid.

Yours, very truly,

S. L. PATTERSON, *Commissioner*.

I am trying to make my letter as short as possible, but I want to add that of the number of cattle quoted North Carolina is accredited with 9,175,782 head. They are of larger size than cattle farther south. It would be certainly safe to count their added value at \$10,000,000.

MR. RANDELL. I wish now to introduce Dr. H. A. Morgan, director of experiment stations of the State of Tennessee, located at Knoxville. Professor Morgan is an eminent entomologist, and will give the history of the tick and make some remarks generally on the subject. He has paid great attention to this tick question for years, and made a close study of the subject.

STATEMENT OF PROF. H. A. MORGAN.

MR. MORGAN. Mr. Chairman and gentlemen of the committee, I wanted to speak particularly with relation to the different species of ticks. First, we have on this chart the ticks that are common or generally found among the animals of the South. This [indicating] is the noted cattle tick, the one of which we are speaking to-day. This is the female and this is the male [indicating].

This [indicating] is a tick looking a great deal like it—what is known as the netted tick. This is the female here and the male here [indicating]. On this side we have the common dog tick. I am explaining these because of the confusion that has arisen in connection with this great problem. This common dog tick is frequently found on the ears of dogs and also on other animals. "This is the female here and the male here [indicating].

This tick [indicating] is known as the lone-star tick, not because of its association with Texas, but because of its marking. It has a lone star upon the middle of its back before inflation. This is the female here and the male here [indicating]. These two species here [indicating] are what are called the common castor-bean tick, and these [indicating] are the common squirrel tick.

Gentlemen, the life history of these ticks is identical up to a certain period, but the point that I want to emphasize is that we have tried

these things. We imported cattle from the North susceptible to Texas fever. We spread upon the cattle millions of these species of ticks—I am not exaggerating—and none of them transmitted fever except this one. We wanted that as a practical demonstration for the farmers of Louisiana.

When you ask what Louisiana has done, I say we have for fifteen years spent money on this matter. We have paid men to go into the field. We have paid men for investigation. We have paid for the publication of bulletins on this subject, and men have gone out on institute work every summer since I have been in Louisiana and have campaigned in the interest of this thing. The State has spent thousands of dollars in this work, and to-day stands ready with \$50,000 more to help and to cooperate with the United States Government in it.

Mr. SCOTT. Do those other varieties of ticks, which you say you have experimented with, injure the animal in any other way?

Mr. MORGAN. Mr. Chairman, I will show you in a minute just how it is that they count for nothing as a parasite of our domestic animals. I have made it clear that this is the species that transfers the fever and the species that is exhausting the fertility of the area below the quarantine line; and I will try now in a brief way to show you why.

This chart, gentlemen, represents the life history of the fever tick. After the tick becomes inflated with blood, it takes from the animal 5 grains of blood in three or four days. My friend, Mr. Meyer, has made a careful weighing of these ticks taken from an animal. Fifteen hundred of them will weigh a pound. When an animal becomes completely covered with these ticks—in the neighborhood of 200,000 or 300,000 of them—it means an exhaustion, through different broods of them per year, of 600 or 700 pounds of blood.

I am sorry I have not the life history of the other species to illustrate just the difference between them and the parasitic habits of this species, aside from the conveyance of the Texas-fever germ; but I will illustrate the other life histories by using this chart of the life history of this one. We will take all the species. When they become fully inflated, say, upon our domestic animals, the female becoming fully inflated, drops to the ground. That is the case with all the species. We can carry them all together up to a certain point. As soon as she is on the ground, during the warm summer weather, in two or three days she lays between 1,500 and 3,000 eggs. The number depends entirely upon the condition of the animal upon which they are feeding, and their development prior to that time. Those eggs, in the summer time, are hatched in from twenty to thirty days. Now, this is on the ground, in our pastures, or wherever the cattle have been roaming.

The CHAIRMAN. You say these eggs drop on the ground?

Mr. MORGAN. The tick has dropped to the ground. It lays its eggs right on the ground.

The CHAIRMAN. They do not lay the eggs on the animal at all?

Mr. MORGAN. No, sir; In twenty to thirty days these ticks have hatched, and they will crawl up on the nearest weed or grass or plant of any kind, and this [indicating] represents the weed or the grass upon which they have congregated. We have, say, 3,000 congregated in a bunch, and there are gentlemen here who have studied the life

history of this thing and know how they will congregate and assemble themselves, waiting for an animal to come along to brush them off. They are congregated on the end of this weed or grass high enough so that the animal in walking along will brush them off; and, gentlemen, I want to tell you that they are standing ready, as long as vitality is within them, moving their front pair of legs waiting for an animal to come along; and you could take that book, or almost anything, and brush it along, and practically all of them will get on. Their front pairs of legs, on account of this movement, have developed to a greater extent than the other pairs. Nature has provided them with that. Why? Because it means the vital point in their economy.

Here is the pivotal point: If a cow does not come along, how long will they remain there? We have tested that question in Louisiana for every month in the year, and we have found that from May until October these things will remain on the grass, waiting for cattle to come along, for about two months. They perish during the warmer weather, when the normal activity of the body is greater than in the winter time. If, then, we remove our cattle from the pastures during two months in the summer time, that pasture is clean; but our cattle have the ticks on them, and if we carry them back there they will infect that pasture again. So that the great question now comes up, the cleaning of the cattle.

Now, gentlemen, here is where the life history of these different species begins to vary. Here is where divergence takes place. With most of the other species, although they assemble themselves just like this one when they get on the cattle, they drop off in three or four days. Now, they have not drawn the blood from the animal at all. They drop off on the ground, one here, and as the cow walks over there she drops another, and so disseminates these things individually over the pasture area; but once the cattle tick gets on there it stays there—all of them. That is the difference.

Now, take these other species. They have dropped and are molting. Here is the species [indicating] showing the molting period. Here is one shedding its skin. I have determined that that thing will stay there two months, some of these species molting, and then will crawl up on an individual plant and wait for a cow to come along. These species that have dropped, one here and one over there, do not amount to anything. They perish before the cattle come. The cattle tick, though, gentlemen—the species we are discussing—when they get on there, every one of them stays on until they molt right on the cow—until they have sucked that five grains of blood and are ready to drop their species on the ground again. The other species have to crawl back after each molt, twice. They get on animals three times; but these cattle ticks, when they get on, stay there. That is the difference in the parasitic habits.

The CHAIRMAN. Then the male remains constantly on the cattle?

Mr. MORGAN. I will explain that in a moment. These [indicating] molt twice on the animal, Mr. Chairman, and just after molting the second time, mating takes place. You will find the two associated, depending largely on the temperature, from six to ten or twelve or fifteen days. The female has engorged and drops to the ground, leaving the male there. The male will remain ten to fifteen days longer than the female, but he perishes. Of course, it would

not make any difference whether the male alone got on, or not. The male can not propagate. I have given you, now, the life history of this tick and shown you the difference between the species.

Mr. SCOTT. You have not told us, doctor, the length of the generation.

Mr. MORGAN. Let us go through it quickly. These eggs are deposited in two or three days in warm weather. They hatch in twenty to thirty days. You can take the longer period, if you wish. If they were collected at once by the cattle, the first molt being eight days, practically, the next molt eight or ten days, engorgement eight or ten days more—in thirty to forty days the ticks that got on the animal in this stage have dropped off. That is the point. Does that make it clear?

Mr. SCOTT. So that it is about sixty days from one generation to another?

Mr. MORGAN. Yes; from one generation to another, from the hatching.

The CHAIRMAN. Sixty days?

Mr. MORGAN. Yes; about thirty to forty days on the animal. In other words, you have a period of thirty to forty days on the ground in summer time, counting the time it would take her to lay, and you have thirty to forty days on the cow.

Mr. SCOTT. That is, from the time the eggs are deposited and until the time the tick hatched from that egg is able to lay another egg it is about sixty days?

Mr. MORGAN. Yes; if the cow picks them up. They may, however, wait for a month before the cow picks them up.

Mr. SCOTT. I understand. That is the most rapid progress.

The CHAIRMAN. In other words, it is possible that he reproduces himself in sixty days?

Mr. MORGAN. Yes, sir; that is possible.

Now, recognizing that life history, you can see from what I have said that if, during certain months in the summer, you take the animals out of the pasture—that is, just the animal upon which this tick feeds; primarily, cattle and horses and mules—the cattle tick starves out, but in winter time we have carried those ticks in Louisiana from September until the 15th of the next April. Here is where the great difficulty comes with the farmers. They will take their cattle out of the pastures and put them in the cornfields and other fields to clean those fields, but they leave this pasture open and the cattle are possibly running into them from time to time, and every time they go into the infected pasture there are ticks waiting there, especially during warm days, and they collect them, so that the farmer in many instances believes that the tick stays on the cattle permanently.

Realizing, however, that it does not, here is the system we have adopted for that section. I would like to emphasize that there are three distinct methods by which the work of eradication could be carried on. The work of Doctor Butler in North Carolina, and the work in Tennessee, following his line of investigation, has been simply this: The cattle up on the northern belt have no ticks on them in winter time, but south of that you go down to the Gulf States and the cattle are loaded with ticks there now, so that after a man gets his cattle clean in winter, all through the northern section of this quarantined area, if he would the next year put them on a field that had been

a hay meadow the year before he would eliminate the trouble, but that is impossible farther down, because the cattle are permanently infested during the winter.

We have carried this thing into what we might call the cultural system of the southern cotton grower, particularly. Here is his pasture over on this side [illustrating on chart]. Based now upon that life history which I have outlined, he takes his cattle out of here [indicating] on the 1st day of June.

The CHAIRMAN. Before you leave the history—that is, the life history of Louisiana?

Mr. MORGAN. Yes, sir.

The CHAIRMAN. Does it vary?

Mr. MORGAN. It will vary somewhat, but the general principles involved, Mr. Chairman, are identical. On the 1st day of June the man has pastured his cattle here [indicating], and this pasture is in good condition, so he puts them in here. He has a double-lined fence from there to there [indicating]. By the 1st of October, according to what I have told you, that pasture is clean, but his cattle are up here [indicating] with ticks on them. Now, how can he clean those cattle? Doctor Melvin has told you that he can do it by dipping, but every farmer has not the dipping vat. It is an expensive thing for each individual to it where there are small farmers; but under this system we take the cattle out of here [indicating] in, say, November, and put them into a cornfield that has been cleaned; and I want to say right here that every plantation below this quarantine line, if it is growing cotton, has the largest part of its area cleaned of ticks every year.

This cornfield is cleaned of ticks, and he puts his cattle in here [indicating], and in forty days they have all dropped off. You tell me that in thirty days they might have hatched. They do not hatch in winter, so that he can put his cattle in the cornfield and clean those cattle, and then he has a clean pasture in which to put them.

Mr. SCOTT. There is no danger of the ticks hatching in the cornfield? They are destroyed by cultivation?

Mr. MORGAN. They will not hatch until the next spring, and that area is in cultivation the next spring.

The CHAIRMAN. And there are no cattle for them to go on?

Mr. MORGAN. No, sir. All the area through the South to-day is free of ticks if no cattle have been on there. That is the point. Now, through that system—and that works nicely into the cultural systems of the country—we can help very materially to eliminate the tick. Then comes up the question, shall we work this line down gradually from the top on to the Gulf, or can we, by some arrangement with the Federal authorities, take in a parish or county away below that line and have the quarantine lifted from that if we guarantee it free of ticks?

I want to say, Mr. Chairman, that our grandchildren will have grandchildren before, at the present rate of movement, it could reach the Gulf, but if sections away below that could be relieved of the quarantine, where the State authorities would guarantee the Federal authorities and on inspection of the Federal authorities, those places would be shown to be free of ticks and the quarantines lifted, that county or that series of counties could go into the cattle business guaranteed that they could develop that industry the same as if they

were north of the quarantine line. That is where we want cooperation, in work of that kind, where it is entirely feasible.

The CHAIRMAN. Suppose you declare free a certain section of the State of Louisiana. As I understand it, the gentleman who preceded you stated that you have there an area down on the coast that is practically free from the tick.

Mr. MORGAN. Yes.

The CHAIRMAN. If you allow cattle to be shipped out of that territory they will have to traverse territory that is infected.

Mr. MORGAN. The cars are clean. The Federal authorities already regulate that. It would be a very easy matter to clean cars. Why not load those cattle in a clean territory and ship them to a clean territory? I think that is being done now.

Secretary WILSON. That cleaning of the coast is not general along all the Gulf coast. In Texas the Gulf coast is infected.

Mr. MORGAN. It is infected; but I can take you, Mr. Secretary, from the Gulf of Mexico to the Mississippi River at New Orleans, a distance of 60 miles, and then up to Baton Rouge, 90 miles, and there would not be five fields in that section with the ticks on them.

Secretary WILSON. So your problem there would be to clear those five fields?

Mr. MORGAN. Let the State clear those five fields, and let the State cooperate with the National Government in lifting the quarantine, and let every man go into it if he wants to.

Secretary WILSON. That is entirely practicable.

Mr. FIELD. Have you ever observed the effect on the northern part of this territory that is exempt from the tick?

Mr. MORGAN. Yes, sir. I would like to answer the gentleman from Texas in this way: Three miles below the city of Baton Rouge, where I was at work, a gentleman had shorthorns and Holsteins, and he laughed at me because I had published a little article on the Texas fever situation. He said we could import cattle in there and there was not the slightest danger. I immediately visited his farm, and there was not a single tick on that place, and that man had had those cattle there five years. I saw as fine animals there as I ever saw at any place.

Mr. FIELD. Were they exempt from other diseases?

Mr. MORGAN. Absolutely so.

The CHAIRMAN. You have made a close study of the life history of this insect. Why is that section free from it?

Mr. MORGAN. That section is devoted almost exclusively to the cultivation of cotton, sugar cane, and rice.

The CHAIRMAN. There are no cattle there?

Mr. MORGAN. There are no cattle there, but that country can be made a cattle country. The planters there to-day could utilize their by-products to feed and fatten cattle. He wants to go into those things, but he can not ship his cattle.

The CHAIRMAN. There is no tick there?

Mr. MORGAN. There is no tick there; but he can not ship, Mr. Chairman.

The CHAIRMAN. Can he not ship to New Orleans?

Mr. MORGAN. He can ship to New Orleans; but where is he getting his cattle?

The CHAIRMAN. He buys his cattle in an infected district. He probably will not go north of the quarantine line to buy them, because it would be dangerous. He takes infected cattle into that district?

Mr. MORGAN. Yes, sir.

The CHAIRMAN. He infects the district, and how can you exempt that district?

Mr. MORGAN. We will not permit him to bring them in there. He will rear his own cattle.

The CHAIRMAN. I want to get at how you can declare a section of country surrounded by an infected country exempt. If you take infected cattle in from an infected country, you can not ship cattle out.

Secretary WILSON. The Federal Government would not permit any infected cattle to go into that neighborhood. They would quarantine it and keep infected cattle out.

The CHAIRMAN. Do I understand the National Government would throw a quarantine around that?

Mr. MORGAN. Yes, sir; that is where we want their cooperation.

The CHAIRMAN. Would the State do it?

Mr. MORGAN. We will cooperate with the Federal Government and we will have nothing to do with that quarantine line.

The CHAIRMAN. You want the Federal Government to establish quarantine lines within your State lines?

Mr. MORGAN. We will do just like Tennessee. Tennessee has its board of health of each county, and inspectors are appointed, and they regulate the shipment of cattle in and out.

The CHAIRMAN. The State does that?

Mr. MORGAN. The State regulates it; but the point is that we want the lifting of the quarantine of that section away below the line, and let us work the line up as well as down.

The CHAIRMAN. I do not believe that you will find that practicable, if I may say so.

Mr. RANDELL. The Secretary of Agriculture says it is very practicable.

Mr. MORGAN. We have a number of breeders who are anxious to breed. Here is a question that has created very great enthusiasm in the cattle industry, and in answer to a question that was asked Doctor Melvin, I would make this reply. You asked him why this thing had come on us all of a sudden. The South saw tremendous possibilities in the discovery through the Bureau of Animal Industry that this tick was the sole agent of conveying this fever germ, and then the discovery that you could take the blood of a native animal and immunize a nonimmune against acute fever; and what did the South do?

They asked the States below this quarantine line—the experiment stations and veterinarians—to inoculate their cattle for them in order that when they put them back on their pastures the stock bulls or the females with which they expected to build up their herds would not die of Texas fever. A gentleman to my left here has animals to-day worth possibly \$1,000 apiece. Those people have found that immunity from acute fever does not in any way guarantee that the cattle business can be made profitable, because of the depredations of the tick as a parasite. Doctor Dalrymple has told you of three or four

hundred high-priced animals that were thoroughly immunized from acute fever, but they died in pasture from parasitism.

These gentlemen have got these valuable animals from the North, and the northern breeders are constantly after us and are perfectly willing to help us in this situation in order that they may get a market for their surplus animals in the South, but we can not go forward because of the depredations of the tick, and they are begging us now, from all over the country, to get assistance in this matter in order that they might breed these animals successfully.

Mr. FIELD. Doctor, have you given any attention to the claim that the Brahman animal is immune from the Texas fever?

Mr. MORGAN. I have done this. At an institute held in Louisiana about seven years ago at the little town of Clinton a man there, a prominent planter and a large cattleman, had heard that Brahman cattle were not affected by the ticks. At that meeting was the son of a man who had imported the Brahman cattle long before the war. This man said that his father had been comparatively successful with the Brahman cattle. That induced the planter to send to your State and bring in two carloads of Brahman cattle. He put them on a pasture. I know the place well, having been over it thoroughly. He put them on a thoroughly infected field, and some of those animals died. To-day that man has not a Brahman animal on his property. Those were grades, but those highly bred grades were maintained to be comparatively free of ticks. I say, gentlemen, it is a question, with parasitism, largely of the condition of the animal. They are a hustling animal and will be freer of ticks than others, but when they become depleted from various causes they go down with this thing like any other animal.

Mr. FIELD. I have learned that one of our stockmen has gone abroad to buy 100 Brahman bulls.

Mr. RANDELL. Mr. Chairman, I will now introduce Prof. Andrew M. Soule, dean of the College of Agriculture of Virginia and director of the Virginia Experiment Stations and of the Virginia Polytechnic Institute, and will ask him to go into the general subject as fully as possible, as I understand our time has been somewhat extended.

STATEMENT OF PROF. ANDREW M. SOULE.

Mr. SOULE. Mr. Chairman and gentlemen, I have been asked to confine my remarks somewhat to the way in which the Texas-fever problem has affected the live-stock industry of the South. Before taking up that question, however, there were one or two notes I made that I would like to call to your attention. I understand Doctor Melvin to say that some \$60,000 a year was spent to maintain the Federal quarantine line. My understanding is that practically no progress has been made in the last twenty years in changing that line, except what has been done in North Carolina. I believe that is right, is it not, Doctor?

Mr. MELVIN. No material change.

Mr. SOULE. Mr. Chairman, the point that appeals to me is this: With a small appropriation it seems to be demonstrated that this tick line could be carried considerably to the south of where it stands to-day. It seems to me therefore that it is a waste of energy on the part of the Federal Government to spend \$60,000 a year and make no

material progress in reducing this infected area, when a small appropriation would enable us to carry that line considerably to the south.

I was also considerably struck with this important thought. I have received a great many letters of inquiry concerning Virginia lands. We have a considerable area of land in our State south of the quarantine line that could be purchased at a low cost. A great many people in the North and West are anxious to come into Virginia. The first question they ask is, Is this land south of the quarantine line? They know if it is that they will have difficulty in developing live-stock industries along profitable lines. Most of those people who want to come to us are stockmen. That is materially injuring the development of the South, from the standpoint of desirable immigration—something we all agree we need very badly.

Now, I wish to take this question up from the standpoint of Virginia, because the problems in our State are practically the same in all the tick States.

We have in our experiment station at Blacksburg some six breeds of live stock. Just a few days ago I received a communication from a gentleman in James City County, who wished to purchase some pure-bred animals to grade up the stock in his neighborhood. That county is south of the quarantine line. We could not send him any animals, nor could I advise him where he could find pure-bred animals to use. We have an institution, therefore, working for the development of our State along live-stock lines, and yet, because of this quarantine, we can not reach out and help those people. James City County has comparatively few ticks. There is no reason, in my judgment, gentlemen, why it should not be cleaned up at comparatively small cost, and to the material profit and benefit of the farmers in that region.

I submit, Mr. Chairman, that it is not a fair proposition for the people of the South to establish a Federal quarantine line, to hold it there, and to do nothing to help these people when they are anxious and willing to help themselves. It is true that the State of Virginia up to this time has not made any specific appropriation for the extermination of the cattle tick. We have a crop pest commission. We also have laws on this subject that will enable us to cooperate in every possible way with the Federal Government. Our people are anxious and ready to cooperate. Our legislature is in session at the present time, and if the Secretary of Agriculture and Doctor Melvin, on examining these laws, finds that they need amendment, I think they can be amended at the present session of our legislature, and I believe it will be possible, gentlemen, to get a small direct appropriation for this work. I wish to make the point clear that Virginia stands ready to cooperate in every way with this movement.

Mr. BOWIE. I think we can make the same pledge for every State.

Mr. SOULE. I appreciate that. I am rather taking this up from the standpoint of one State—not to speak for one State, but to show the problem, if possible, as it affects one State. It practically affects them all in the same way.

Mr. BOWIE. I think the suggestion is a good one, that whatever additional legislation the Department thinks we ought to have I believe we can all get together and see that we get it, and also get help.

Mr. SOULE. I wish to make that point clear, because the question was raised this morning that a number of the States were not ready to cooperate. That may be true, but they will put themselves in a position where they can cooperate as soon as they realize that their laws are not in accord with the wishes of the Federal Government.

The CHAIRMAN. As a general thing, where the Federal Government undertakes to do it the States immediately lie down.

Mr. SOULE. That has not been so in Virginia.

The CHAIRMAN. I suppose that is human nature. If you can get somebody else to do your work, you are very apt to let him do it.

Mr. SOULE. Some of the counties in Virginia have been put south of the quarantine line, and other counties are now in a measure ready to be taken north of the line, and other counties will be put in that position even with a small appropriation, some \$2,000, that is being spent now, in addition to the State veterinarian's salary. We can not afford to lie down on this proposition. We have 24 counties in Virginia south of the quarantine line, and it is costing those people at least \$60,000 a year on a moderate estimate to have the cattle tick.

The CHAIRMAN. The tick is not bad there, is it?

Mr. SOULE. Not bad, sir, and that is the very point. Demonstration work can be undertaken there—educational work, cooperative work with the Bureau of Animal Industry—and that territory can be cleaned in a comparatively short time, and I believe safely on the estimate of the amount per county given by Doctor Butler.

The CHAIRMAN. It seems to me, from this map here, that all the territory north of South Carolina, Georgia, Alabama, and Mississippi could be very easily cleared.

Mr. SOULE. Yes, sir.

The CHAIRMAN. And the quarantine line brought south just so much. Tennessee, North Carolina, Virginia, and Kentucky could be made absolutely free in a short time, because, I take it, the tick is not so very bad in any of those States?

Mr. SOULE. Yes, sir. We have a number of counties where there is only a scattering infection. We can do nothing by ourselves without Federal cooperation. We have no power to move or change that line. One of the things we wish is the appointment of additional inspectors, who will aid in cooperating with our people in going south with that line, isolating the infection and helping to clear it up, so that we can move these counties north of the line.

If a demonstration can be undertaken in one State, or thirteen States, all the infected States, and the people shown that this thing can be done, that this country can be freed of tick infection, that it will enable them to compete successfully with the cattle growers of the West, they will go into the live-stock business. There are men in Virginia, and in other sections of the country, who have made extensive investments in pure-bred animals under the impression that they could be immunized. One gentleman, Mr. Mayer, of Louisiana, has spent some \$10,000, and lost it all because the immunization was not effective. Our people therefore are afraid of this proposition, and they are afraid of it with reason and justice on their side.

This proposition, however, to show you how it affects a State even like Virginia, is this: Three-fourths of our counties are north of the

line. We have the Appalachian region of our State—a magnificent blue-grass territory. It is one of the few places where export cattle are grown on the grass without grain. In that section of our State our animals are worth, as three-year olds, \$70 to \$80, and just one county removed from there, where they could grow grass almost as well as in any part of this region, cattle are worth \$10 and \$12 apiece at 2 and 3 years old.

The CHAIRMAN. What section is that? What counties are those, Doctor?

Mr. SOULE. You go down into counties like Nottoway and Amelia, and down in that territory, and in Pittsylvania County, and then you go back in Tazewell and Russell. That is in the heart of the cattle country.

The CHAIRMAN. And Wythe?

Mr. SOULE. And Wythe, and all through there; yes, sir. That condition exists in our own State. This question has been raised. It has been said grass can not be raised in many sections of the South. I wish to correct that idea. Our people have had no incentive to raise grass. They have been a cotton, corn, and tobacco-raising people, until our soil in many instances has become depleted. They find that in order to maintain their position agriculturally they must rotate the crops. To make rotation of crops possible they must grow many crops that must be fed on the land. If they can not bring in improved breeds of cattle, so that when an animal is maintained to the age of three years, it will be worth from \$50 to \$75, they can not afford to go into this business. The average value of the cattle in some of the southern States is not more than \$9. The average value in Iowa is \$20. Climate, soil, and crop production may have its effect, but the principal effect is due to the fact that they can bring in a number of pure-bred animals into Iowa and maintain them successfully. If they take them into the South they encounter the tick, and we lose our investment and are unable to make any permanent improvement in our animals.

In the State of Texas where, handicapped by the tick, many pure-bred bulls have been sent, in a country where they can not grow grass as they can in the State of Iowa, but where they have many valuable by-products, they send to Chicago range cattle that took the cattle prize at the recent international exposition. That shows you what this country, with the incubus removed, can and will do; and we plead that these people have an opportunity to develop these live-stock industries, by which they will heal the million sores the South is suffering from to-day in the washing and erosion of our valuable agricultural land, because they can not be brought under a rotation of crops and the live-stock industry developed as it should be.

I would like to say also that as long as our people are prevented from developing these live-stock industries they can not use some of their most valuable crops profitably. We produce in the South, as the Secretary of Agriculture knows, and I have heard him emphasize this point before many a southern convention, nearly 2,000,000 tons of cotton seed every year. We are shipping one-quarter of that to Denmark and Great Britain to be fed by the people who are putting products on the market in direct competition with the American farmer, if not the southern farmer, to-day, certainly with the northern farmer. If those people can take our cotton-seed meal from

Texas and Louisiana and carry it to Great Britain and feed it successfully, why would it not be a profitable investment for our southern people? A ton of cotton-seed meal, at a conservative estimate, is worth \$23 for fertilizer alone. Take that same ton of cotton-seed meal and feed it to a steer, with silage and other crops, such as cow-pea hay, crops that grow magnificently in the South, and we can make three or four hundred pounds of beef out of a ton of it, and have 80 per cent of the fertilizer to restore to impoverished soils.

That is what I plead for—for enough cooperation on the part of the Federal Government to help these people out of the rut. Our people know they are in it. They are striving to get out. Here is this incubus put here. Here is the line established by the Federal Government. You are doing absolutely nothing at the present time to remove that line or help us. Our people ask for your cooperation, the appointment of inspectors, for demonstrations, for education, for an agitation of this question that will lift our people up where they will appreciate what lies just in front of them when they are rid of the tick. Our people are spending thirty to forty millions a year for commercial fertilizers, and it is all right. We must have it under these conditions, but I suppose one-quarter, or possibly more, of all the cotton-seed meal produced, is the basis of the nitrogen and a part of the phosphoric acid and potash in all our standard fertilizers.

Why should not our people feed that first and then use it as a fertilizer? We all know that humus or vegetable matter is the first essential for crop production. It is the thing we need in our soils more than anything else. We can not have that until we have rotation of crops and use the legumes to rebuild our soils.

Just one or two other points. We have beef cattlemen in the South at the experiment stations. I have seen beef made at a cost of 3½ cents a pound. I have seen beef made at a cost of 14 cents a pound. The difference was largely due to the quality of the live stock. In the Cumberland Mountains in Tennessee, a barren, sand-stone country, a gentleman brought in a pure bred Hereford sire, and crossed that animal with the native cows of that community. We fed some of those steers at the Tennessee experiment station. They dressed down from 60 to 63 per cent of the live weight when fed 180 days on silage made from corn and sorghum and on cotton-seed meal and corn and cob meal, the products of the South. Those animals sold on our college farm at 5 cents a pound, live weight. I have fed cattle, the unimproved stock of the South, that did not make more than three-quarters of a pound of gain per head per day, and when they were sold did not slaughter out more than 50 to 52 per cent of the live weight.

The CHAIRMAN. How much profit was there on the cattle that sold at 5 cents a pound?

Mr. SOULE. The profit on those cattle, I think, was between \$8 and \$12 per head. I would not be positive of those figures.

The CHAIRMAN. After paying for all the feed?

Mr. SOULE. After paying every legitimate expense in connection with the experiment. That can be duplicated in every section of the South, when you remove the incubus that the tick places upon the free bringing in of pure-bred stock. The farmers all over the North are anxious to locate in the South. We have much cheap land. The greatest opportunities for the American people to find homes and to

develop a great country, when they can do it along live-stock lines, is in our country, but if they are to do it along the lines of cotton and tobacco production without relief, they can not hope to succeed, and the South must go down instead of rising up and taking her place, as she should, and as she will do, when you have given our stockmen the means by which they can build up this industry and make it the vital force in the development of the South that it should be.

The CHAIRMAN. The cotton-boll weevil is going to be a great benefit to you down there—

Mr. SOULE. We realize that fully, sir.

The CHAIRMAN. If it will take you into diversified farming.

Mr. SOULE. But how will we go into diversified farming when this tick says "You shall go this far and no farther?" What shall we do without assistance? If this were a question for the State of Louisiana, I say we would not be justified in coming here and pleading with Congress for an appropriation. We would not be justified in doing it if the Secretary of Agriculture and the gentlemen associated with him were not willing and ready to take up this work. We would not be justified if the State were not ready and anxious to cooperate; but the State of Virginia by itself can do absolutely nothing with a line that is over 5,000 miles long. It is a national question, a Federal question, and we must have your assistance. I submit we are making a reasonable proposition. We are merely asking for a beggarly pittance to help the southern farmer to get on his feet and establish this great live-stock industry.

Mr. LAMB. How many inspectors have you in Virginia now?

Mr. SOULE. I would have to ask Doctor Ferneyhough as to that.

Mr. FERNEYHOUGH. I have nine working under me in Virginia now.

Mr. SOULE. He has nine working under him alone. They are paid by the counties.

Mr. RANDELL. What are some of the practical things which could be done with this appropriation if this committee makes it?

Mr. SOULE. I think one of the first things we have to do is to educate our people, to make them understand. It is just as Doctor Dalrymple told you. The people do not understand this question yet. One of the things is to go into these various places and demonstrate to them that they can be rid of the tick. We have to teach them the life history of the tick, that by going at this systematically they can get rid of it in two or three months in the State of Louisiana.

We have to go out in the fields and work with them. You can print bulletins and you can fire long range at these people for a hundred years and you will make no impression. The thing that counts with them is to go to their homes and take every man by himself, just like you gentlemen know how to do, and make him feel you are interested in him, and that you will help him to solve his problems. Then you have made a friend of that man. You have approached him in a reasonable way. You have put him in the right path, and you can lead him as far as you want to lead him.

The CHAIRMAN. How much of this infected district is in Mr. Lamb's Congressional district?

Mr. SOULE. Just one county.

Mr. LAMB. Chesterfield County.

Mr. COCKS. I would just like to ask the gentleman one question. Suppose two cattle come in from New Orleans in equal condition,

one from the lower Appalachians and one from the Northwest, is there any discrimination against them on the New Orleans market?

Mr. SOULE. On the market in Louisiana?

Mr. COCKS. Yes; the New Orleans market.

Mr. SOULE. There probably would be no discrimination there; but take it in the city of Richmond. I have seen it myself. Let one steer come from north of the quarantine line to Richmond, and let one come from Chesterfield County. They may be two steers of equal merit. They may have been dropped on the same date. They may have been fed by the same man, if you please, in two different places. They may weigh the same. They may have made the same rate of gain; and you let a judge go in there from some place who is not familiar with the quarantine element, and ask him to pick out which is the best animal, if he picks out the one that comes from south of the quarantine line and a butcher in Richmond comes there to buy that animal, he will discriminate against that animal from south of the quarantine line from a quarter to half a cent a pound.

Mr. LAMB. I have seen that done every day.

Mr. MORGAN. The price in New Orleans of any animal from south of the tick line is just a quarter or a half a cent less than if the animal were from above the line.

Mr. COCKS. For instance, Louisiana does not produce enough cattle for her own consumption, does she?

Mr. SOULE. They can not do it. If you go into the State of Virginia, you will find western beef. Those people can not produce beef under the conditions under which they labor at the present time.

The CHAIRMAN. Do you know that the dressed beef of Chicago can be sold anywhere cheaper than the local beef?

Mr. SOULE. It can, under this condition.

The CHAIRMAN. It can, under almost any condition. It can be raised in Iowa and then sent back there from Chicago and sold cheaper than the beef sold by the village butcher.

Mr. SOULE. That is another thing for Congress to remedy; that we have nothing to do with.

The CHAIRMAN. That is American enterprise and push, working up all the by-products; but that is irrelevant. Excuse my interruption.

Mr. SOULE. There is one question I wish to make clear. I have heard it stated often that the South can not produce beef because it can not produce grass. We have grasses that will take the place of blue grass, grasses that will grow on comparatively poor soil. We can cover up our lands with grass if you give us the power to make the business profitable and place us on an equal footing with the other farmers of the United States. We are discriminated against to-day because of this tick line. We are discriminated against unjustly. I will undertake to make beef practically as cheap in the South as you can make it in other parts of the country; but when you say to me I shall have a margin of a cent for feeding my beef, and then I shall put my cattle in the market, pay freight, and be discriminated against, have to pay inspection fees, have to put my cattle in a quarantine lot when they are just as good as anybody else's, I can not do business on that basis, and no other farmer can.

Mr. RANDELL. Mr. Chairman, I will now introduce Mr. Wright, of Georgia.

STATEMENT OF R. F. WRIGHT.

Mr. WRIGHT. Mr. Chairman, I thought it had been arranged that Colonel Redding would speak for Georgia. I am simply the assistant commissioner of agriculture, and I did not expect to speak.

Mr. REDDING. Tell about what Georgia is doing.

Mr. WRIGHT. While I am up, before I yield the floor, I want to say this. About four, or perhaps five, years ago we took up this question. A number of the farmers in north Georgia, cattlemen, wanted something done. We got in communication with our secretary, and we had a little bill passed to appropriate the small sum of \$500 or \$600 annually looking to the suppression of the cattle tick. We went to work and we cleaned up four counties, and we have four counties now above the quarantine line. We have two other counties that we are now working in with that little \$500 annually.

When I first went up to investigate this matter, at a small town in Murray, there was a cattle buyer there. The line ran right through the town, almost. He priced a steer on one side of the road and said, "I will give you \$50 for that steer." Well, there was a steer right on the other side of the road, from below the quarantine, and the man said, "Well, my brother over there has the mate to it that weighs just the same." He examined both of the steers, and he only offered \$40 for that one. That showed the difference.

As to the education proposition, we need that very materially in Georgia. About three years ago a man named Evans, at Watleigh, Ga.—Colonel Redding, you know the man—passed through. He was going up to Tennessee. We told him something about the tick. It was a new thing to me at that time. He said he was going to buy some shorthorns. I told him unless he had them inoculated or was careful he would lose his cattle. He said he had been used to the tick all his life. He was a very intelligent man, and he said he would risk it. In ten weeks he lost \$600 of the \$700 or \$800 worth of stock he had bought. He came back and got our literature, and since then he has been a little more careful. Those things happen frequently throughout Georgia.

Now, as to grasses. I will illustrate what we are doing in the grasses by a little incident that happened up in St. Louis. The Colorado man was present at the exhibit, and had it in charge, and Colonel Poole and myself had been to Baton Rouge, and from there we went to St. Louis. Colonel Poole is the commissioner of agriculture of Alabama. This Colorado man showed us the grasses that were grown in Colorado, and especially the alfalfa and the timothy and a number of other grasses, and he said, "I understand you are from Georgia and you are from Alabama?" "Yes." "Well, of course you don't grow any grasses down there. You raise a little cotton, peas, and a right smart cane." I told him "Yes; sometimes we raise cane—more kinds than one," but we had a little exhibit over there, and I told him that I would like for him to go around, but we only had a small exhibit. Well, he said he would not be interested in the Georgia exhibit. I said, "We have given you fifteen or twenty minutes and you must go and help us to investigate Georgia." Finally he consented. He looked at Georgia and he said, "Georgia didn't grow this hay."

We had 87 varieties of grass hay, and piled over it was plate and a blue ribbon. His under jaw fell, and he said, "I think you must have gotten your surrounding States to grow that grass." I told him no; that most of it grew in the county experiment stations of Spalding County. He said, "Well, he did not understand that." I said, "My friend, I will tell you that we can grow all you can grow in Colorado, and a thousand other things besides. We just simply sent up this grass here to show you that we could grow grass. You knew we grew cotton and made cane."

Now, as to the history of the trick and everything of that sort, that has all been covered, and I am not an expert in that; but while I am up I want to say that the commissioner of agriculture, P. G. Hudson, who could not be present, wanted Colonel Redding and myself to represent Georgia here to-day, and to say that we stand ready, as we have in the past, to cooperate with the Federal authorities. We need more money. We need it along the lines the gentlemen have spoken of. I think it is very necessary that this appropriation should be made. I think we are simply asking for our own. I think we are entitled to it, and we hope the committee will give us a good appropriation.

Mr. FIELD. How did you spend your appropriation of \$4,000 or \$5,000? What did you work on?

Mr. WRIGHT. We have four or five inspectors that put up a trial line around the county. We call that a State line, and we put our line up and worked this State man on the State line, cleaning it up of ticks.

Mr. FIELD. On the plan that is proposed here?

Mr. WRIGHT. On this same plan. We post this trial line and we keep that man riding up and down that line for a year until we have practically cleaned out the county. Maybe it has taken us two years in some cases. Then after we have cleaned it up, we ask for a Federal special inspector. He comes down and looks over this county and spends two or three weeks there, and he finds that county is clear. Then he will recommend to the Federal authorities to lower our line, so as to take in that county. This is a very slow process.

Mr. SCOTT. Let me ask you this question right there. Suppose there are infected counties intervening between the present line and this line?

Mr. WRIGHT. We have not tried to do that. We just commence at the upper tier of the counties, right next to Tennessee; and now we are met with two counties, Polk and some other county, that are infected, and we can not go farther west. There are two counties over there that we can not clean up, in the northern part of our State, because Tennessee adjoins us with the infected territory.

Mr. SCOTT. If you will pardon me for interrupting, I will like to ask Secretary Wilson now whether, under the present law, he would be authorized to lift the quarantine as to some particular county, if there were counties intervening between it and the quarantine line which were infected?

Secretary WILSON. I will ask Doctor Melvin to state what the fact is.

Mr. GRAHAM. If you will let me anticipate you, Doctor, it has been done in my Congressional district.

Mr. SCOTT. I ask that question because one of the speakers before us this morning suggested that was a point for future legislation, and I gathered from a remark that Doctor Melvin made that it was already an existing law.

Mr. MELVIN. That can be done whenever in the discretion of the Secretary it is desirable to do it. If a considerable section in a State was found to be free from ticks, and the State would place a quarantine around that section and give a reasonable guaranty to the Secretary that the quarantine will be maintained—that is, that infected cattle will not be permitted to go into this section, and if facilities are afforded by railroads for cattle getting out without going across land—we could make that provision. We now have a similar provision for cattle from the free territory in western Texas passing up through Texas and the Indian Territory, which is in effect up to the markets of Kansas City and Chicago. Within that quarantine district we have established clean yards. They are quarantine yards within a quarantine district. They are made clean by scraping all the surface of the ground away, and nothing but cattle from the clean districts are permitted to unload in them. This is necessary in order to feed and water them in transit.

Mr. SCOTT. I think it is entirely proper such an arrangement should be made, and I call attention to it now for the reason that Doctor Dalrymple, I believe, suggested that was one of the things that should be done, leaving the inference that it could not now be done.

Mr. MELVIN. I would also explain that we have a similar proposition within the quarantine line, where part of the State is within the tick district and part of it is without. In the first place, the Secretary would quarantine the entire State, the free and infected portions altogether. Then when the State places a quarantine, dividing the two sections, and guarantees to maintain that line through the State, the Secretary then modifies his line to conform to the State line. They adopt the same line. The maintenance of that line of cattle traffic within the State devolves upon the State, but if that is violated by actually going outside of the State then it becomes a violation of the Federal line.

Mr. MORGAN. Take Louisiana. You have spoken of that. Louisiana is so far down below the line. Would that be feasible?

Mr. MELVIN. Yes, sir; if the proper quarantine is maintained and railroad facilities and steamboat facilities are sufficient for shipping out.

The CHAIRMAN. Do you suppose it will be possible to establish a lot of noninfected regions, you might call them, below the present quarantine belt—a county here and a county there?

Mr. MELVIN. They should be of considerable extent. I do not think we would be justified in maintaining lines around a very small area.

The CHAIRMAN. How small an area do you think should be the limit—I mean south of the quarantine line?

Mr. MELVIN. I should think it would be several counties together.

The CHAIRMAN. You think you could do it?

Mr. MELVIN. Yes, sir.

The CHAIRMAN. And rely entirely on the State's supervision?

Mr. MELVIN. Not entirely. In the first place we would send inspectors there to see whether the cattle were free of ticks. If we found they were, and they had laws and officers to enforce the laws, then we would be justified in accepting that.

Mr. RANDELL. Mr. Chairman, I now introduce Major Graham, of North Carolina, who will tell us in three minutes, I think he says, how they have arranged this interstate quarantine in his State.

STATEMENT OF MAJ. W. A. GRAHAM.

Mr. GRAHAM. Mr. Chairman, in our section we have had a stock law for a good long time. When the stock law comes to light, the tick disappears. You can scarcely find it in the quarantine line away up here [indicating], and here is some territory here that is still infected. Gaston is entirely clean. Gaston is up on that line [indicating]. Here is the infected piece in there [indicating].

Mr. SCOTT. How large is that area?

Mr. GRAHAM. It embraces this part here [indicating].

Mr. SCOTT. That area is now free?

Mr. GRAHAM. No; that area is infected.

I do not see, gentlemen, if the whole Southern country was inspected, what you want this money for. If you find where the cattle tick is not in existence, why should those people be now in quarantine? Why not quarantine the man that has got the ticks? If an inspector goes and finds ticks on a farm, they should not run this line around everybody else, but they should simply tell him he must quarantine his own ticks. You can not pass a law for the regulation of the States. You have got to leave it to the discretion of the commissioner of agriculture. In our State the legislature has been very liberal with us. I was in the last legislature, and, though I am not a lawyer, I helped to get up the code that was recently adopted, containing regulations concerning the transportation of cattle, which are left to the board of agriculture, and are as much a law as anything else.

I hope you gentlemen understand that the States did not make this line. The Federal Government made it, and if every tick was gone out of North Carolina, we could not move that line by State authority. It has to be done by the United States Government, and after we have inspected it all over, the United States inspector has to go there and see whether what we have said is true. Why not let him go along with our man, and we can get along that much faster? He can see that the territory is free, and we can get our territory rid of the quarantine that much earlier. I suggest to you gentlemen our plan of leaving these regulations to the board of agriculture, just like you leave them to the very efficient Secretary of Agriculture in national affairs.

The CHAIRMAN. From looking at this map here, I should think with very little effort on the part of Virginia and North Carolina—and they have got to cooperate—they could clear those two States, because, as I understand it, the tick it not at its worst there.

Mr. GRAHAM. The territory behind it is all clear.

Mr. RANDELL. I will now ask Colonel Redding, of Georgia, to entertain us for five minutes, as our time is getting quite limited.

STATEMENT OF COL. R. J. REDDING, DIRECTOR OF THE GEORGIA EXPERIMENT STATION.

Mr. REDDING. Mr. Chairman and gentlemen of the committee, I have but few remarks to make. The ground has been pretty well covered by these experts and by Doctor Soule. He is, like myself, a director of a station, and understands the economic aspects of the question.

I want to say this: This is an old question. It is not a new question at all, except the question of making this appropriation. I have been up against the tick for forty or fifty years. We are raised on ticks almost in the South, in some respects. We only discovered some sixteen or eighteen years ago what was the cause of this fever. Before that time we were well aware that we could not bring cattle from England and from France and from the Northern States of the Union down to the South with any degree of safety whatever.

We thought we could introduce them down here by bringing them at a certain time of the year. Then experiments of that sort were made, and resulted in nine cases out of ten in disaster and loss. The South, a hundred years ago, was on a parity with the North on the cattle question. We began to import English cattle, and to-day there are old men who speak of all these improved breeds of cattle as English cattle. They were brought here and landed, some at Charleston, some at Savannah, and some at New York, and along our Atlantic coast.

The effort has been for fifty years, in my own knowledge, to improve the cattle breeds of the South. They have all ended in failures. We did not know what was the cause of it. We thought it was a climatic question pure and simple. We thought the South, owing to the enervating summer climate which a great many people think we have, but which is a great mistake, was not a satisfactory climate. The cattle would take a kind of sickness.

We did not know what it was, but we called it acclimation fever, and red mud and red water, and I did not know how many other things; but only a few years ago we found that the germ of that fever which has been prevailing all the time and destroying our cattle was carried by the cattle tick. This is quite a new discovery. I find that even members of Congress, some of them, do not know that. They know a great deal. I read the Congressional Record. Congress understands all about politics in the Philippines and the Santo Domingo question, and all that sort of thing, but do not know much about the cattle-tick question, because I saw they were all interested listeners here to-day when the experts were telling all about it.

This is a great big question. I believe it is the biggest question that has occurred since the civil war; and, by the way, that old quarantine line runs remarkably close to the line that separated the North and South. I and several thousands of others fought over that line four years, and we brought it south—that is, you did. Now, we want you to do the same thing with this new quarantine line. We want it brought south, down to the Gulf of Mexico and down the South Atlantic coast.

The CHAIRMAN. We will have an easier time to push it south now than we did in 1861.

Mr. REDDING. Yes; because we are going to help you. You pushed us to the wall then, but now we dare you to push us to the wall. We are going to help you this time, however.

Georgia, Louisiana, North Carolina, South Carolina, Tennessee are all ready to help you in this matter, but no one State can accomplish it by itself. I want to make this point before I sit down. You have heard these experts here. You have heard these other gentlemen representing the Departments and boards of agriculture. These gentlemen have no axes to grind. They know what they are talking about. They are representing the people. They are representing the interests of the South. There is no politics in this thing. They do not expect to make any exploitation of it on their own personal account. These gentlemen are representing the interests of the people, pure and simple, who sent them here. That is a circumstance that is not always present at a hearing before a committee of Congress.

We do not expect to make any hundreds of thousands of dollars out of this for ourselves. We want to put the South on a parity with the North in all respects. As I said yesterday, if this matter had been settled a hundred years ago in the different Southern States, and we had been rid of the tick, I believe the South would have been as great a country to-day as the North. If we had not had ticks in the South we would have been enabled to import pure-bred cattle from England and to raise cattle with the same success they have attained in the North and Northwest. We would have made money enough—though of course we would have spent it all the time—to pay the national debt.

Mr. FIELD. It might have been a sufficient amount to affect the result of the war.

Mr. REDDING. I have no doubt it would. We might have been so rich that we would have been a southern confederacy now.

The CHAIRMAN. Can you hold out any hope that there will be a change in the vote if we shove this line down?

Mr. REDDING. I do not know, sir. I am disposed to say anything that will encourage you to make the effort.

Mr. RANDELL. I now wish to introduce to you Mr. August Mayer, a practical farmer from the State of Louisiana, who has had some experience personally in importing fine blooded cattle from the North, and dealt in a personal way with this cattle-tick question.

STATEMENT OF AUGUST MAYER.

Mr. MAYER. Mr. Chairman, as Mr. Ransdell has said, I come here as a farmer, pure and simple, who holds no office. [Laughter.] It has been several times said that I have spent as much as \$10,000 in bringing these improved cattle from the various Northern States South. That is a fact, but in addition to that \$10,000 I have spent another \$10,000 in the last four years to find the cattle tick, and after having had experience for four years, for which I have paid the round sum of \$10,000, I find myself to-day not quite where I was four years ago.

In other words, I can truly say that the cattle tick has caused me a loss of \$10,000 in the last four years, and to-day the solution of the problem is only the eradication of the tick, and nothing else. If we

can not eradicate the tick, I might as well call the \$20,000 a loss and be done with it.

A few years ago we invited immigrants to come down and locate with us. Our lands were cheap. We attracted a few. From the State of Missouri came a practical farmer, who brought with him 23 head of full-blood Holstein cattle. He bought a place near the city of Shreveport for \$5 an acre, and put his cattle on that land. He knew nothing about the tick, and at that time the people around there knew little about it. What was the result? The man came in the fall, because he was advised that acclimation fever might destroy his cattle, and he had better come in the fall so as to have the winter in between. The man came in the fall. The next May that man had lost 21 head of cattle, and it was all that he owned. Those cattle at that time were worth \$5,000 or \$6,000.

The CHAIRMAN. Had there been any cattle on that farm previous to that time?

Mr. MAYER. Yes; cattle roamed over that country all the time.

The CHAIRMAN. Unfenced country?

Mr. MAYER. Unfenced country.

I will state another example besides mine, and I have that from a reliable representative of the Department of Agriculture. Near the city of Dallas another enterprising farmer, a German or a Norwegian, bought a small piece of land, the money for which he had earned by hard labor for a number of years. He bought the piece of land and ran a small dairy. He was thrifty, and succeeded in accumulating more money in the course of a few years. Finally he said to himself "Well, I am going to borrow all the money I can and I will go into the city of Dallas and buy all the nice heifer calves of the Jersey breed that I can get."

He went to work and bought 50 head of cattle, 50 high-priced calves, in the city of Dallas. He took them hopefully down to his farm, and in less than no time all of them except two, I think, perished. The poor man, who had worked for perhaps ten years from morning until night, lost his entire belongings. Why? Because those calves were raised in the city of Dallas, where there were no ticks. He brought them outside of the city and put them in his pasture where there were ticks. The man was ignorant of the fact, and the consequence was that that man was brought down again to the financial condition he was in when he came to this country some years ago.

Mr. RANSDALL. The education of the people is one of the most essential things for the Government to undertake.

Mr. MAYER. They need education. Without education this problem is a hopeless one.

The CHAIRMAN. For how many years has the Secretary of Agriculture been telling the southern people it is dangerous to take northern cattle down there?

Secretary WILSON. We have been telling them for some years, but an object lesson is worth a great many speeches.

Mr. RANSDALL. I called for bulletins on this subject, and I could find but one such bulletin in the Department of Agriculture. The others were out of print.

The CHAIRMAN. I think the cattle men of the country have under-

stood for years and years that it was a dangerous proposition to take northern cattle to the South.

Mr. RANDELL. Go ahead, Mr. Mayer.

Mr. MAYER. I wish to cite just another example showing how the farmer is affected by the conditions existing.

I have been listening for some time to the teaching of the Department of Agriculture. I have diversified. I have invested money here and there and every way to get into diversification, and to abandon the cotton crop we have had there for years. I am largely a cotton planter now, but I have been pioneering somewhat in various directions with similar results to this. Last year I went to Texas and bought two carloads of yearling steers.

Unfortunately I could not find them on a particular farm where I knew there were ticks, so finally I encountered a dealer and inquired of him whether his calves were bought below the fever line. He said yes. There were indications that some of them had ticks on them. Some of them had not. Finally I bought two carloads of steers, at a cost of \$800. I brought those steers down and put them in my pasture, and in due course of time, from eight to ten days, of these 50 head of steers, some of them looked as if they had an acute case of Texas fever. A few days later another bunch showed up, and the end of it was that now, a few months after I bought them, of the 50 head of steers I had 15 left and they are worth about 4 bits apiece. There I dropped another thousand dollars. Why? Because those cattle were bought here and there, and he picked some up out of areas that were tick free. I did not know it, and perhaps he did not know it.

So in our own State we have that occur every now and then, and almost all over the South, as soon as the farmer attempts to put his finger into something like that he loses money, and if a man has nothing else to fall back on but this cattle industry he will be dog poor; and if we keep on using whatever we can gather from our other land to supply this industry, we will lose, and we would go to the poorhouse if we have one. I believe, however, we have no poorhouse in our district.

Mr. RANDELL. I now introduce Dr. J. G. Ferneyhough, State veterinarian, of Virginia.

STATEMENT OF J. G. FERNEYHOUGH.

Mr. FERNEYHOUGH. Gentlemen, this work in Virginia has fallen upon my shoulders for several years, as State veterinarian. Under our present law, this work with the cattle tick, as also with all other contagious communicable diseases among domestic animals, falls on the shoulders of the State veterinarian. Therefore I receive many letters from all parts of the country, not only from people in Virginia, but people coming to Virginia, complaining about this quarantine line, by the way, more than they do about the tick. Therefore I want to appeal to you for help in this case.

Gentlemen, you have been asked what the different States have been doing. I will tell you what I have done in Virginia. I have gone to work along that line, commencing at Bedford County and running on in a way that I will describe, and those of you who

are familiar with the State of Virginia will understand, going in a southeasterly direction, following the James River to the city of Lynchburg, and on to Charles City County and the counties of Appomattox—perhaps Buckingham, I am not sure about that—Cumberland, Powhatan, etc., I do not believe those counties will average five infected farms to any county. I have worked hard in there, but I can not get the people to do anything, because they say, "I have worked with you, and yet you won't take us out of the quarantine." I say to them, "As long as you have any ticks in there I can't get you out;" but you will find a few stubborn people everywhere, or people who do not have time to attend to it, owing to the line up there. Please understand I do not complain of the Federal line. It is a good thing, such as it is, and it is going to stay there; but owing to that line being there I can get so many ticks and no more.

I do want to see you gentlemen go ahead. You have got the line there. I have cleaned a lot of territory. Give us more money and let us clean some more. Virginia is doing it. They do not limit me in my expenses. I may go out and work all day every day for a week or ten days, and the State of Virginia will pay my expenses. Of course I get a salary, and I have taken advantage of that situation and worked among the people and employed the local inspectors. I have three veterinarians working under me. One of them is Doctor McCulloch, who is also an M. D. He says, "Look here, Doctor, this thing is getting mighty dry. We don't get ahead much." Until we get Federal support the people are not going to appreciate our efforts.

Mr. BOWIE. Under proper help and support from the Federal Department, how long would it take you to clean Virginia down to the North Carolina line?

Mr. FERNEYHOUGH. I honestly think that in four years Virginia could be cleaned, with the proper support.

Mr. SCOTT. What could the Federal authorities do to hasten the work you are already doing?

Mr. FERNEYHOUGH. It could help in this way. I have cleaned a county out so far, and I am not complaining about the Federal people. They have been a great deal of help to me, but, as Doctor Melvin has said, I have to wait until they come along and say whether the county is clean. When it is once done, they should come and make that statement. We want you to give us the material and to work with us. We have got local men, and we want the Federal men to come in and help us, or we want you to give us the money to do it with.

Mr. SCOTT. About all you expect from the Federal appropriation would be the employment of an additional number of Federal inspectors?

Mr. FERNEYHOUGH. That is all we want. You might call it education, or call it anything you want. I say, gentlemen, we have lived long enough with this tick. We want to live without it.

Let me tell you what the other thing comes down to. It is like the old saying that if you give a dog a bad name you might as well hang him. You may have no infection in a county, but you can not get the price for the cattle from that county. They have got a bad name. They are down from a tick country, and no matter how fine they are, you can not get the price for them.

Mr. SCOTT. You made the remark that there may be five or six stubborn people in a county who will not do what you want them to do, and their places remain infected. How do you expect to overcome that difficulty?

Mr. FERNEYHOUGH. In this way: If we have a Federal man there and also a State man, or if we have regular officials as inspectors, we can place the quarantine around there and, if necessary, visit every day, and he will get mighty sorry and be glad to agree to our terms to get out.

I think the ground has been pretty thoroughly covered, gentlemen, and I thank you for your attention.

Mr. RANDELL. I will ask the Secretary of Agriculture to say a few words on this subject, and to conclude the hearing.

STATEMENT OF HON. JAMES WILSON, SECRETARY OF AGRICULTURE.

Secretary WILSON. Mr. Chairman, the subject has been pretty well covered, and I will endeavor not to repeat anything which has been said; but I congratulate you, sir, and your committee on the very thorough and scientific manner in which these gentlemen have discussed the matter. I am glad to know that the Southern people have come to the time when they would like to get rid of the tick.

There are a good many reasons why it would be wise to have that done. There are international reasons. They know abroad that we have the tick here in the Southern States, and they are watching us all the time. They make it an excuse for discriminating against us just as far as they can. They discriminate all the time, and it is expensive for us. We have to keep men abroad in the markets to see to it that our cattle get fair play, and they are expensive men.

This subject might be discussed from a great many standpoints. This committee has given my Department money to prepare the people for making a living in the South independent of the tick, and we have established probably 150 object-lesson farms all over the tick country, in the boll-weevil country more especially, and we have indicated to those people that they must diversify; that it is an absolute necessity. It is well known that diversification along agricultural lines can not be successfully conducted without the pasture and without the domestic animal to graze the pasture, and that means the cow and her calf, and all that. We have been inquiring into the possibility of extending the dairy interests in the South. We selected an expert from the South Carolina stations to get us information with regard to what we can do toward helping the South to make its own butter, and to consume its own by-products.

One of the great weights against the development of agriculture in the South is the seeming necessity of selling their cotton-seed meal to the northern feeders. Where grasses are not grown and animals are not produced the soil becomes exhausted of its organic matter. It is oxidized out, and the soil becomes thin, and those great southern rivers have to be wide enough to not only carry away the waters of the South, but to carry away the soils of the South also; for all the years that the South has been growing cotton they have been reducing their soil along those lines, and the way to rejuvenate the southern

soil is to get the domestic animal there. Much could be said along that line. It is an absolute necessity.

Another national view is that the good lands have been pretty much bought up all over the great Northwest and are being occupied. They have become valuable through the building of railroads and all that, and the young fellows who want homes are not able to pay the \$80 and \$100 per acre in the Northwest for our best lands and they have to do one of two things: Go north into the British possessions, or go South. The cheapest lands in America to-day are in the South. There is no comparison between the lands of the South and the lands of the North and the lands of the West along those lines. Within two hours' ride of where you are sitting now you can buy lands in Maryland for from \$15 to \$20 per acre that will grow great big heavy crops. As has been stated here, there is a dread in the minds of the people on that account. This is one of the great disabilities that northern men meet when they come down here now. The northern farmers are mostly stockmen and they want to bring their herds with them, and this difficulty meets them when they attempt to come down and make homes. Notwithstanding all that, they are coming, and they are coming fast; and I venture the assertion that the best immigrants the South can get is the northern farmer.

Those of us in the Department of Agriculture who have been carrying out your orders along those lines, Mr. Chairman, have had some experience along national lines already and quite recently. We went into New England when it was invaded by a cattle disease and spent in the neighborhood of \$300,000 of Government money in a few months and stamped that disease out, and did it promptly.

Lest I forget, I might state here in this connection, that the Federal Government, through its agents, can do things in a neighborhood, either North or South, that the people who live there can not do as efficiently and as well as we can do. We do not know any politics. Political influences do not count with us. We are there to do our duty. Our object is to get rid of the disease, whatever it may be.

We are at work now in the mountain regions of the Northwest getting rid of two diseases—sheep scab and cattle mange, and I want to say to the committee for their encouragement that we are succeeding. Several of those States have been cleaned out already. Others will be. We meet difficulties that will be met as we go south to do this work. Some contrary fellow does not want to go in with his neighbors and dip his cattle. He holds out, and he works on the neighborhood to make them hold out. It takes Federal authority to bring these fellows to their senses. We say: "Yes; you can hold out. We will just quarantine around you, and you can not ship until you dip your cattle." In all kindness we say that. It generally brings them, eventually. I know one man, a vigorous fellow, who stopped the whole work of North Dakota. He got into the State senate by some means and managed to induce his people to believe that the conducting of this work by the Federal Government was not the way to do it. He wanted State agents appointed, and they gave the patronage one to each senator, if I remember correctly. The result is that North Dakota has not done anything lately; but North Dakota will not get her stock out until she does do something, and she will. She will go at it again.

So that a large amount of money has been expended in doing this from a national standpoint. We are spending large sums in the mountain States, from the national standpoint, for the benefit of the whole nation, and we are succeeding. We will clean out those diseases, and the day will come, not very far hence, when we will be able to tell you that we are through with them. I think you have sometimes been kind enough to say, now and then, Mr. Chairman, that you would like the Department of Agriculture to finish up something. We did finish up New England.

The CHAIRMAN. You did, and you did it splendidly.

Secretary WILSON. We will finish up the Northwest, and if you send us down South we will finish the tick.

We in the Department of Agriculture have not heretofore been alive to the great incubus on those people down there, our brethren of the South. The time has now come. We are ready, and the only question is when the South will get ready.

Representatives from one or two States spoke to me about the time I was getting up my estimates for you and I put in \$25,000 thinking that would make a beginning in some one State, or maybe two States, and we could experiment along the line. By and by two or three others came and I sent you another letter stating I thought from the way things looked we would probably need \$50,000. Now, I find the whole South is ready, and I think you had better make it \$100,000 at least, Mr. Chairman.

There is one part of our record to which I again call your attention. I do not believe any committee in Congress looks as thoroughly into the expenditure of the money in the Department of which it is in charge as you do here, and you know we have never lost one of your dollars. In New England we had half a million, and we turned back a very large amount of money that we did not need. We are economical in our Department and careful of the public moneys; and you are not going to make any mistake, Mr. Chairman, in making a liberal appropriation, because we will be careful of what we do with the money, and if we do not use it it will go back into the Treasury and you can appropriate it over again for something else—building a battle ship or something else.

The subject has been so thoroughly discussed and so exhausted by these intelligent gentlemen who have spoken that I do not think of any particularly new point.

Mr. SCOTT. Mr. Secretary, can you give us, in a very brief statement, an outline of what you expect to do?

Secretary WILSON. Yes, I can. We will first require every Southern State to get legislation giving their own money and their own authority and inviting us to cooperate. Then we will go down with authority. We will get into cooperation with the State experiment stations to begin with. We will make amicable arrangements where we will work—where it is wisest to begin—and we will try to get the people ready for it. A great many people in all sections of the country do not know very much about what the Federal Government is doing. They are learning more and more, however, of what it is doing, as we are sending them about 12,000,000 pieces of literature every year. We will try to get into amicable relations in those several States. The conditions will vary in the several States. We will begin, in short, pushing that line farther south.

If we find localities inside the line where they have been doing the work and where it is easily cleaned out we will help them. We will make arrangements between us and the South. We will arrange to have them pay their money as we pay our money, and I have no doubt at all that when we are at it for a year or two the States will respond heartily and liberally, and as the people learn that we have pushed the line south and cleaned out certain neighborhoods and counties there will be a universal demand that we go everywhere, and we will be asked to go further than we have means to go. But I believe in a reasonable number of years we will exterminate the tick all over the South.

The CHAIRMAN. Would it be a fair proposition to have the several States appropriate the same amount of money that the National Government appropriates to be spent within that State—something in the line of the good-roads proposition?

Secretary WILSON. Not on the line of the good roads.

The CHAIRMAN. I mean that is the proposition of the good-roads system, that the States will furnish an equal amount of money with the amount furnished by the National Government.

Secretary WILSON. Yes; I know what the proposition is.

The CHAIRMAN. Something along those lines. Would that be a fair proposition?

Secretary WILSON. I think that after we have been at it a year or two the States would be willing to agree to that, but I believe it would be wise to appropriate a liberal amount of money to begin with, and let us send our agents down there and let us get advice in regard to the situation in the several States. Then we can act more intelligently after that.

Mr. RANDELL. I would like to ask whether New England was requested to contribute anything when you got half a million for stamping out the foot and mouth diseases there?

Secretary WILSON. No.

Mr. RANDELL. New England was not asked to contribute. The Government put up the whole amount.

Secretary WILSON. Out in the Northwest, in our work there, some of the States are doing more. Since we got the work begun in the mountain States of cleaning out the scab and mange some of the States are paying more money than we are paying, and that will be repeated in the South. As soon as the people down there learn that they are getting rid of that pest they will come up promptly and do anything that you see fit to ask them; but I would not wait for them to begin.

Mr. RANDELL. You can depend on that. The South will do her part.

The CHAIRMAN. You know the old saying, "God helps those who help themselves." If we put the Government in the place of God this time, as one member of the committee I want the Southern States to remember these promises.

Mr. RANDELL. You can depend on our making good.

Secretary WILSON. They will want us, in the course of one or two years, to go quicker than we have money and men to go with. That will be the universal feeling all over the South. I have no doubt about it. That has been our experience elsewhere.

Mr. BOWIE. Do you think any part of this appropriation could be made immediately available so that work can begin before the beginning of the new fiscal year?

Secretary WILSON. I think I would begin in the spring and organize and get ready. I would make some of it immediately available so as to enable us to begin to work.

Mr. LEVER. How much, Mr. Secretary?

Secretary WILSON. The appropriations all become available on the 1st of July. If you made \$25,000 immediately available, we could begin with that and get ready and do our preliminary work.

Mr. RANDELL. We have nothing else, Mr. Chairman. I wish to thank you most heartily for the patient manner in which you have listened to us.

The CHAIRMAN. It has been very interesting.

Mr. RANDELL. In behalf of all of us, I extend you our thanks.

The committee, at 1.40 o'clock p. m., took a recess until 2 o'clock p. m.

AFTER RECESS.

The committee reassembled at the expiration of the recess.

The CHAIRMAN. Mr. L. W. Page, the Director of the Office of Public Roads, is present this afternoon, and the committee will hear any statement he may have to make. When he has concluded, the members of the committee will ask such questions about special matters as they may desire information upon.

STATEMENT OF L. W. PAGE, DIRECTOR OF THE OFFICE OF PUBLIC ROADS.

Mr. PAGE. Mr. Chairman and gentlemen of the committee: I wish to make, in the first place, a brief statement in connection with which I desire to file three tables containing detailed information, and ask permission to file them as part of my statement.

1. To enable the Secretary of Agriculture to make inquiries in regard to systems of road management throughout the United States.

A digest is now being prepared of the road laws of every State and Territory, with a special view to setting forth clearly the systems of road management provided by law, as well as to ascertain the limitations upon change in such systems and the authority for such changes as may be advisable. In addition to this, a work of much greater magnitude is being carried on for the purpose of ascertaining the amount of money expended in road improvement, the number of miles of common roads, the number of miles of improved roads, the number of men subject to labor tax, the rate of compensation per day, the amount of bond issues, and other information pertinent to the subject. This data, when considered in connection with the systems of road management prescribed by law, will by comparison with other systems and the results achieved by other systems indicate clearly the weak points in the systems thus compared, and afford a basis for remedial action.

(See under "Information," No. 1, Routine collection and compilation of information; also specimen sheets.)

2. To furnish expert advice on road building.

The Office is carrying out the provision of the bill in regard to expert advice by cooperating in the construction of object-lesson roads, by sending out engineers and experts specially qualified to deliver addresses and advise with local organizations and county officials on the subject of road improvement; by detailing engineers to examine into local conditions and render expert advice concerning the kind of material best adapted for the improvement of a given road, the method of construction that should be adopted, and to make such surveys and estimates as the case may require; to point out to local officials the changes that would promote the efficiency of their road administration, and where request is made, to outline such systems as are best calculated to give the desired results. It is the constant endeavor of the Office to organize a corps of competent highway engineers qualified to meet all requirements, and to place upon an adequate footing the corps of road experts, roller operators, and the equipment of machinery, in order that the greatest amount of work with the least expenditure of money might be accomplished in accordance with the highest standards of road construction.

(See No. 1, Object-lesson roads; No. 2, Public instruction; No. 3, Special advice on construction and administration of highways, under "Highways.")

3. To make investigations in regard to the best methods of road making in the several States.

During the present fiscal year young engineers of the Office have been detailed to make careful studies of the methods of road building employed in the Eastern States, and arrangements have been made whereby these young engineers could receive instruction in all the details of highway engineering as applied in the building of roads of the most improved types. In the construction of object-lesson roads the engineers of the Office apply the knowledge gained by such investigations and also familiarize themselves with the methods in use in the particular locality in which they are working. There are many sections of country practically devoid of natural hard-road materials, and the Office is endeavoring by means of investigations and experiments to devise some method of road construction that will answer the purpose in lieu of standard methods, such as may be employed in States where hard materials are available. Among such forms of special construction may be mentioned sand clay, burnt clay, tar, oil, and oil residue, as well as special methods of treating earth roads.

In addition to the regular engineering and expert corps of the Office, specially qualified engineers and experts along these several lines are employed from time to time as the case may require.

(See under "Highways," No. 4, Student instruction; No. 5, Experimental work; under "Tests and laboratory investigations," No. 3, Experimental work; No. 4, Special work.)

4. To make investigations in regard to the best kinds of road-making materials in the several States.

In order to carry out this provision of the bill in a manner that would be at all adequate or serviceable to the public it would be necessary to employ a force of geologists to make road-material surveys of every county in the United States and prepare charts or

maps showing location, character, and quantities of material. The appropriation hitherto available has been entirely inadequate for such a work, and it has therefore not been attempted, although it is thought that the laboratory work of the Office answers the same purpose in a limited sense, as information is given concerning such samples as are sent into the laboratory.

5. To investigate the chemical and physical character of road materials.

The routine testing of road materials has been carried on along the same lines as heretofore, and a comparison of the records indicate that during the present fiscal year the volume of work is fully 40 per cent greater than during the past fiscal year. In addition to the routine testing a very large number of requests has been received for the testing of clays, wood blocks, concrete, gravel, building materials, and asphalt. It has been possible to do very little of this special testing work owing to our limited facilities.

(See under "Tests and laboratory investigations," No. 1, Physical tests; No. 2, Chemical tests; No. 3, Experimental work; No. 4, Special work.)

6. For the employment of local and special agents, clerks, assistants, and other labor required in the city of Washington and elsewhere.

Work has been carried on with the smallest force compatible with the good of the service, but the need for additional assistance has been greatly emphasized by the fact that in order to carry on routine work it has been frequently necessary to keep the force overtime, and in the field it has been possible to comply with only about 10 per cent of the requests which have been received from rural communities.

(See under "Highways," No. 1, Object-lesson roads; No. 4, Student instruction; No. 7, Clerical; under "Tests and laboratory investigations," No. 3, Experimental work; No. 4, Special work; No. 7, Clerical, and under "Information," No. 1, Routine collection and compilation of information, Dissemination of information by special correspondents, and otherwise.)

It is absolutely essential to the good of the service that provision be made for a chief clerk at \$1,800 per annum, on the statutory roll. There is scarcely a division of work in any great corporation that is without a chief clerk, and the salary recommended is as low as is consistent with the responsibilities of the position and the requirements as to ability. So far as I know, there is but one chief clerk receiving a smaller salary than this.

7. For collating, digesting, reporting, and illustrating results of such investigations and experiments; for preparing, publishing, and distributing bulletins and reports.

The statutory roll for the current fiscal year provided for an editorial clerk, who has been engaged, in addition to editorial duties, in preparing a bibliography on roads and road improvement and in collating information on the subject. Publications have been issued as follows:

Circular No. 38, Study of rock decomposition under the action of water, by A. S. Cushman. Farmers' Bulletin No. 235, Cement, mortar, and concrete, by P. L. Wormeley, jr. Farmers' Bulletin No. 239, The corrosion of fence wire, by A. S. Cushman.

There is now in course of preparation a revision of the yearbook article by Mr. Spoon on sand-clay roads, which is to contain information concerning burnt-clay roads; a bulletin on road legislation, which is to deal with all phases of the subject; a bulletin on the history of road building in America; a bulletin on macadam construction; a bulletin on the constitution of Portland cement; a series of circulars giving out the results of our inquiries into road expenditures, mileage, bond issues, etc.; a bulletin descriptive of the experiments carried out under the direction of this Office in tar, oil, and oil residue as road materials and the results of such experiments, and a revision of the bulletin on the testing of road material. There are several bulletins in contemplation, among which might be mentioned one on earth roads, which will contain a full description of the split-log drag method, and a circular on country road administration.

8. To enable the Secretary of Agriculture to assist the agricultural experiment stations, and disseminating information on this subject.

At the close of each year a brief report has been drawn up for the use of the experiment stations, showing what has been done by the Office during the year. The agricultural experiment stations sometimes cooperate with the Office in object-lesson road work, and wherever work of this character is done an endeavor is made to work in cooperation and harmony with the experiment stations.

Mr. HENRY. You have been asked here to make any explanations you may see fit in regard to the changes in the proposed law, indicated here by italics.

Mr. BOWIE. Explain your reasons for the changes.

Mr. PAGE. With regard to the change "to investigate road-making materials," it seemed to me that we were rather too much confined by investigating road materials throughout the United States only, and I thought that a general investigation might be productive of good, if we could find good methods anywhere in the world. As a matter of fact, the investigation never has been confined to the United States. We take the French reports and the Swiss reports in regard to the methods of road improvement, and wherever we can find anything we think is good we use it. It seemed to me rather unnecessary to limit it to the United States, when we may be able to find something good somewhere else.

Another change which I requested comes under the head of "To furnish expert advice on road building; to make investigations in regard to methods of road making, *and to demonstrate same.*" We have got to study all methods to find out and decide which is the best, so I thought it would be better to cut out "best" and I have added "*and to demonstrate same.*" My reason for that is that it is impossible to go to a community where nothing is known of methods of road making, and that is the condition which exists throughout most of our rural communities, and tell them to do certain things and expect good results accomplished. The very first thing they ask is: "Can you not show us how to do this. Just build us a little piece of roadway. We will furnish the labor and material if you will just show us how to use them." For that reason I thought it would be well to request the committee to insert "*and to demonstrate same.*"

Mr. HENRY. I do not gather from what you say that you ask for the right to build roads.

Mr. PAGE. No; we have nothing to do with that. We let the local communities build the road. We simply furnish the expert supervision, and show them how to use modern machinery in road building.

Mr. SCOTT. Can you give us an idea of what it would cost to give one such demonstration?

Mr. PAGE. Yes; I have a table from which I think I can tell you, practically, what every demonstration we have ever made has cost.

Mr. SCOTT. I do not care for an elaborate statement; but I would simply like to have some idea as to the average cost of a demonstration that would be useful.

Mr. PAGE. We have built about ninety roads, object-lesson roads, and the cost varies, depending on the character of the road. We have worked it out here so as to give the cost by the square yard and by the mile.

Mr. SCOTT. I do not care about the cost of the road per mile; what I want to get at is how much it costs the United States to furnish the expert supervision necessary to direct one of these demonstrations you are now asking to be permitted to make, under the law?

Mr. PAGE. It generally requires from one month to six weeks' time to do the work. It requires the expenditure of traveling expenses and salary of the engineer, and where we use a roller it costs about \$3 a day for the roller operator for the time we use it. I should say, roughly speaking, although I never worked it out, it would cost from \$150 to \$300.

Mr. HENRY. For each demonstration?

Mr. PAGE. For each demonstration, but not the actual cost to the Government. It would be very hard to estimate that. We try to work in one section, and send what we call a crew to that section. We generally send a crew to a locality where there are several applications, and where one engineer can superintend several pieces of work.

Mr. HENRY. Speaking of rollers, do you furnish the machinery for these demonstrations?

Mr. PAGE. No, sir; we have not done so heretofore. Up to the time I came into office we always borrowed the necessary machinery from the manufacturers; but I found that very objectionable, for the reason that they have sent their agents there when our men are on the ground, and I do not think it looks right. But still, you can not demonstrate the methods of building modern roads unless you have modern machinery. One of the very important reasons why I have asked for an increase this year is for the purpose of allowing us to rent our machinery. I do not think we want to own machinery.

Mr. HENRY. You mean to rent it from local parties on the ground?

Mr. PAGE. No, from the manufacturers; we can rent it at a very low rate. It would amount to from \$195 to \$200 per year.

Mr. BOWIE. How can you manage to get it so cheap as that?

Mr. PAGE. Because it is a great advertisement for them, and for that reason they are willing to let us have it for nothing. But if we rent it, they can not take it away from us and sell it, as they would otherwise do. If we were to make such an arrangement, I would

have it stipulated in the contract that under no circumstances should they send a sales agent where work is going on. It would be perfectly understood that we did not favor any particular roller, as there are a number of good ones.

I think it would put the work on a very much more dignified and solid basis if we did not borrow anything.

Mr. HENRY. Would you allow the manufacturers to offer their rollers at a certain rental?

Mr. PAGE. I have done that, to ascertain just what would be the cost, and practically everyone of them say that they will let us have it at anything we may offer.

Mr. HENRY. In other words, they would furnish a roller free?

Mr. PAGE. Yes. Others say: "We will give you all you want if you will use ours;" but we can not do that. We have got to use them in order. There is also to be considered the matter of cost of transportation and accessibility to the locality.

Mr. HENRY. You propose to give each manufacturer a chance?

Mr. PAGE. Yes.

Mr. HENRY. In rotation?

Mr. PAGE. Exactly; taking them up in rotation. There are about six or eight manufacturers.

Mr. HENRY. And all good?

Mr. PAGE. All of them good.

Mr. BOWIE. But you think it would be more dignified and proper for the Government to pay 5 per cent of the cost rather than to buy them outright, and to pay all of them at that rate?

Mr. PAGE. Pay all of them at the same rate.

Mr. BOWIE. The compensation would be merely nominal, of course?

Mr. PAGE. Yes.

Mr. BOWIE. Because it wears out 5 per cent a year?

Mr. PAGE. At least that. If a city rented a roller, it would have to pay from \$5 to \$10 a day for it; but it is a great advertisement for them to have us use their machinery. I hope that the local communities which can afford to buy rollers and modern machinery will do it, because it helps the building of good roads.

Mr. BOWIE. It is not your plan to buy any of these rollers?

Mr. PAGE. No.

Mr. HENRY. Who operates the rollers?

Mr. PAGE. Our men operate them. We could not allow others to do it. That was done in the past, but I have good reason to believe that the manufacturers were paying regular premiums for the sale of their rollers. The only way we can do the work well is to have entire jurisdiction over the rollers and have our own men operate them. The cost does not amount to much. It is a very small increase that we have asked for.

Mr. BOWIE. What part of the estimate will go to the rental of these machines? You have asked for an increase of \$30,000. What portion of it would you apply to that purpose?

Mr. PAGE. It would be about \$6,000 for all machinery—not only rollers, but all machinery.

Mr. BOWIE. You propose to treat every one on identically the same basis?

Mr. PAGE. Exactly.

Mr. BOWIE. There would be no such thing as competition?

Mr. PAGE. Absolutely no competition. Every expert roller operator would have instructions and would understand exactly how we rent machinery, that there are a number of good rollers, that we take whichever one happens to be convenient to the locality, and that we rotate, as nearly as we can, without detriment to the work.

Mr. HENRY. What do you do with regard to materials? Do you have materials given to you?

Mr. PAGE. The local communities give us the materials.

Mr. HENRY. Delivered on the ground?

Mr. PAGE. Yes, sir. The local communities have to supply the materials.

Mr. HENRY. Do they furnish you with the help to spread it?

Mr. PAGE. Yes. All that we furnish is the expert supervision and, where practicable, the modern road machinery. They furnish the material and labor and provide for all contingent expenses.

Mr. HENRY. Your expenses consist only of the salary of your engineer and operator and the rent of the roller?

Mr. PAGE. Yes, sir.

Mr. HENRY. That includes practically your entire expense?

Mr. PAGE. Yes. We give communities to understand that we do not build roads; we simply cooperate with the local community in their construction.

Mr. SCOTT. I hardly understand the necessity for this change of language in the bill, because you have already been doing this sort of work under previous appropriation bills, have you not?

Mr. PAGE. We have. I spoke to you gentlemen about that last year. If we are doing it, however, would it not be well to make the bill clear?

Mr. SCOTT. I thought it was sufficiently covered by the language in the last appropriation bill. I remember the discussion in which it was made clear that it was not the wish of this committee that you should build roads for the public, but that we were satisfied to have you do this demonstration work. It is under the authority of previous laws that you have been doing just exactly the work you are now asking to be permitted to do. As I understand you now, you are this new language as giving you any power that you have not already been doing under general authority?

Mr. PAGE. Yes, sir.

Mr. HENRY. Do I understand you to say that you do not regard this new language as giving you any power that you have not already been exercising?

Mr. PAGE. Absolutely none. I do not ask for any more. I would like to say we have been doing it, and it has been approved of by the committee. There is no clause I have requested here which gives me any more power than I now have, but I think it makes it clearer and more precise. There is also a repetition which I have cut out.

Mr. HENRY. Where is that repetition?

Mr. PAGE. It reads: "And the best kinds of road-making materials in the several States." I have cut that out. That would call for an investigation of road materials. In the next passage the bill says: "To investigate the chemical and physical character of road materials." That is simply a repetition of the other.

Mr. SCOTT. That is along the lines the committee has been working on for a long time, in the way of simplifying the language of the bill, so as to make it express its purpose in the fewest possible words. I am sure the committee would thoroughly approve of any rearrangement you might suggest that would not materially alter the bill.

Mr. HENRY. You omit the words "and the best kinds of road materials in the several States?"

Mr. PAGE. I ask that that be omitted. There is one point that might be brought up as being slightly new legislation, "and materials of construction relating to agriculture." I have inserted that. I am not asking for any more power than I have had.

Mr. SCOTT. What do you mean by that phrase?

Mr. PAGE. We take up certain problems, such as the methods of making concrete fence posts out of reenforced concrete, and we have published a bulletin on the subject, instructing farmers, in a simple way, in the uses of concrete on the farm—how to make horse troughs, floors, fence posts, and, in short, how to utilize concrete on the farm and take advantage of it as engineers are now using it in the cities. We get hundreds of letters asking how to mix concrete and how to use it.

Mr. HENRY. What does an ordinary concrete fence post cost, supposing it is 7 feet long?

Mr. PAGE. The cheapest we could make one, working on a small scale, was about 55 cents a post. That was reenforced with 1 per cent of steel wire. There is another problem that we took up in the division of tests of the office at the request of the Secretary of Agriculture. That is the corrosion of steel fence wire. We get a large number of letters from farmers and also from editors of agricultural journals stating that the fence wire in use twenty-five or thirty years ago lasted very much better than the present wire on the market today. On the other hand, some of the manufacturers say the steel wire is better than the old puddled-iron wire. Doctor Cushman, who is present, has made a preliminary investigation of the subject in so far as our limited means and facilities for this sort of work would permit, and he has shown beyond all doubt that the old fence wire is superior in lasting qualities to the new.

Mr. HENRY. Why was that? The old wire was iron wire, while that you use now is steel wire.

Mr. PAGE. If you wish to have the information at first hand, Doctor Cushman will be glad to tell you the reasons.

Mr. HENRY. If it comes in well now, we might let Doctor Cushman tell us what the reason is. Is it in the galvanizing or in the iron?

Mr. CUSHMAN. It seems to be a question of both. As you know, there is now a great demand that products should be turned out rapidly. The faster the product can be passed through the mill, the cheaper the product, and therefore the wire is run through the rolls very much faster than it used to be. The wire passes through the galvanizing process much faster than it used to do, and the consequence is that it does not have time to take on as heavy a coating of zinc. At the present time telegraph and telephone wire is made which will carry about 4 per cent of zinc covering, whereas the ordinary fence wire sold to the farmer carries from $1\frac{1}{2}$ to $2\frac{1}{2}$ per cent.

Telegraph and telephone companies know enough to make specifi-

cations, and they will not buy wire unless it has a certain weight of galvanizing it. They are willing to pay for a better product. The farmer is helpless in the matter of specification for his fence wire.

This condition may possibly be corrected in the future through the farmers' organizations, such as the granges and institutes.

Mr. SCOTT. Have you ever figured how much the proper additional cost would be for more heavy galvanizing?

Mr. CUSHMAN. It is impossible for me to get at such figures, because they are known only to the manufacturers, and unless the manufacturers are willing to furnish them we can not get the data. I spent a portion of last summer in wire mills, studying this question. I found the manufacturers inclined to be courteous, and they were willing, up to a certain point, to give information.

Mr. SCOTT. I asked the question merely to bring out your opinion as to whether the additional cost would more than overbalance the additional life of the wire.

Mr. HENRY. There are two things, as I understand you, which are accountable for this condition: First, it is the haste in manufacturing the wire, and, secondly, the material used in galvanizing. Both of these causes cheapen the cost and cheapen the article.

Mr. CUSHMAN. To make myself quite clear, I will state that in order to run the rods rapidly through the rolls they require a certain sort of metal. Telephone and telegraph wire is run more slowly through the rolls, and the percentage of manganese is kept very low because the specifications call for it to be below a fixed standard. This is owing to the fact that manganese increases the electrical resistance of the wire. If you cut down the amount of manganese the rods must pass more slowly through the mill. Manganese tends to make the metal more ductile, and it will roll better. Fence wire that has been run rapidly through the rolls usually has about one-half per cent of manganese. I have analyzed fence wires that have run as high as $1\frac{1}{2}$ per cent of manganese.

Mr. HENRY. Is that objectionable in fence wire?

Mr. CUSHMAN. There is a very widespread opinion, based upon the observation of a great number of scientific men, that the effect of manganese is to increase the rate of oxidation.

Mr. HENRY. Is the steel they use to-day as good as the iron wire they used to use?

Mr. CUSHMAN. It corrodes more rapidly.

Mr. HENRY. After the surface is worn off?

Mr. CUSHMAN. Yes; and before.

Mr. PAGE. I brought that point up merely to illustrate the problems that are being thrown on the laboratory end of our work by the Department, as we have the only laboratory that is equipped for work of that nature.

Mr. HENRY. It is important work.

Mr. PAGE. There is no consecutive line of work. It consists of problems that come up, and they are all referred to us. I therefore think it would be well to suggest to the committee that this clause be inserted in the bill.

Mr. SCOTT. Can you give us any idea as to the amount of money you will have to spend, by the end of this fiscal year, on entirely new problems that you have not touched in previous years?

Mr. PAGE. Yes; I can tell you exactly. On experimental work this year we expended \$1,486, and I have requested for the next year \$2,342.

Mr. SCOTT. Has that \$1,400 been expended in doing work you did not have to do before?

Mr. PAGE. That includes tests of road materials also, when special tests are necessary. It includes also the two problems I have just mentioned. We have spent this year \$786 for such work, and I have asked for \$1,592 for the next year.

There is another point I should like to bring up, which is, that quite a considerable portion of the increase asked for is for the purpose of allowing us to pay our traveling expenses and transportation on the railroads. The custom that was in use before I took charge of this office was to borrow all the road machinery and to beg the railroads for free transportation, both for machinery and for men. I do not approve of either. We are discussing now, in Congress, matters of rate legislation; and I think it does not look very well for the Government to be begging the railroads for passes for its employees and property.

Mr. HENRY. I should indorse that statement.

Mr. PAGE. I should like to pay our way.

Mr. HENRY. I think the Government should pay its way.

Mr. PAGE. I think the people would respect the work a great deal more, and I think the men who work for the Office would feel very much freer and more independent if they were enabled to pay their way. The railroads are very glad to give us the transportation.

Mr. HENRY. What do you estimate to be the extra expense of eliminating all deadhead transportation?

Mr. FIELD. Do you not think that question ought to be taken up in the several Departments and have some policy settled upon?

Mr. SCOTT. Is it not a fact that there is a general policy?

Mr. HENRY. The Post-Office Department pay their way.

Mr. SCOTT. I know there is a law by which officers of the Army and Navy, when traveling under orders, are given half rates over land-grant railroads. Those railroads are obliged to give them half rates. I do not know of any other work under the Government where free transportation is requested in the manner suggested by Mr. Page.

Mr. PAGE. I also want to bring one other matter to the attention of the committee. I earnestly request that the committee may make the necessary appropriation for one clerk of class 4. The greatly increased correspondence and routine work in the Office makes it necessary, in my opinion, that this should be done.

The committee at 4 o'clock p. m. adjourned until to-morrow, Friday, at 10.30 o'clock a. m.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Washington, D. C., February 16, 1906.

The committee met at 10.30 o'clock a. m., Hon. James W. Wadsworth in the chair.

The CHAIRMAN. We have before us to-day, gentlemen, Mr. Hays, the Assistant Secretary of Agriculture, and also some gentlemen representing cotton growing and spinning interests in the United States.

The subject to be considered is particularly and peculiarly the Bureau of Statistics in the Department of Agriculture.

Mr. BOWIE. Mr. Chairman, as we have gentlemen here from a distance, it might perhaps be proper to give them the first opportunity. They would not be interested in the details of the estimates particularly.

The CHAIRMAN. I thought the idea was to have Mr. Hays first give to us, and in the presence of those gentlemen, a statement showing his proposed reorganization in a general way of the Bureau of Statistics, and then they might criticise it or suggest amendments to it. That was the idea, was it not, Mr. Lever?

Mr. LEVER. That was the idea I had in mind when I made the motion inviting these gentlemen here. I wanted Mr. Hays to make his statement before these gentlemen, in their presence, and then ask them to criticise it.

The CHAIRMAN. To have him tell these gentlemen what he proposes to do in the way of reorganizing the Bureau of Statistics.

Mr. LEVER. Yes.

Mr. BOWIE. I do not object to that. I did not understand it in that way.

STATEMENT OF W. M. HAYS, ASSISTANT SECRETARY OF AGRICULTURE.

Mr. HAYS. Mr. Chairman, if I may make the suggestion, I would very much like to hear these gentlemen before I make my statement. I do not know what they have to say as to the status of this work, and if they have anything to say I would like to hear them say it now, and then if they have anything to suggest regarding the plan of the Department, after I present it, I shall be glad to have them do so.

The CHAIRMAN. That would be rather putting the cart before the horse. The committee would like to have you give your ideas in a general way of how this Bureau ought to be reorganized and then have them agree with you or discuss the matter informally with you, and we will be listeners, as it were. We will be the judge and jury to a certain extent.

Mr. HAYS. Mr. Chairman, I am quite ready to make a general statement first.

Beginning with the scandal concerning crop reports early last June, the Secretary at once put in motion an investigation. The first part of the investigation was made by officers of the Department, assisted by secret service officials. Then the District court took part in the investigation, officers of the Department assisting in that. Later the Keop Commission made an investigation, officers of the Department again assisting. I was away during the month of June, but in July, after my return, at the time Mr. Hyde resigned, I was placed in charge of the Bureau and in charge of the investigation, which has run to this time, and is still in progress, as to how to develop this work of statistics.

Early in my own work in the Bureau I investigated the personnel, so far as the leading officials of the Bureau were concerned, and I have had with me and have trusted very largely in this investigation two men—Mr. Olmstead, the associate statistician, who was made associate statistician on Mr. Holmes's removal, and Doctor Clark,

then chief clerk, since made assistant statistician. We have investigated the office methods of the Bureau, the methods of using the reports from a large number of different classes of reporters and computing and tabulating these and bringing them to a result for the whole country—for the whole of the United States area of a given crop or given product.

I came to this work from work that is supposed to be more scientific than statistical work. I have come to see that this is much more scientific and more interesting than I had at first presumed. I have come to see that there are some fundamental things that have been worked out in this statistical work in the last forty years that were working right. There were some things that were not working well. The Secretary's instructions to me were that I should try to find what was good and what was weak and save the good and add to it.

We have investigated also the field methods, and we have found some things there that were good and some that were weak. We have investigated the accuracy of the results, and we have found that when the work was done well under the old plan the results were generally good—not that they were an enumeration, but that they told the market whether it should go up or down. Sometimes the figures were very accurate, sometimes one side and sometimes the other. In the case of cotton for the last six years, for instance, the reports were above the final estimates from the commercial crop and the ginner's crop three times, and below three times.

Mr. SCOTT. Professor, I hate to interrupt you, but I want to ask right there how the accuracy of your estimates on corn and wheat compare with the accuracy of your estimates on cotton.

Mr. HAYS. They have not been so close, because greater care has been taken with the cotton. There have been influences at work in the South which have rather tended to induce people to bend their reports, and these reports we found had to be revised, and lately we have been revising them. But that work was carried out more thoroughly with the cotton and gave better results. I might say that all along the line there have been an immense lot of experiments made, and we have endeavored, in projecting a new plan, to take advantage of those experiments and use what was good in the construction of the plan.

Mr. LEVER. Did I understand you to say that there were influences at work in the South tending to bend these reports one way or the other?

Mr. HAYS. Yes, sir; the general movement in the South to reduce the acreage, and all of that, had the effect on the minds of the people to make them think sometimes that there was not a very big crop of cotton.

Mr. LEVER. There has been no tendency among your reporters, however, to underestimate or overestimate? You think they gave you nearly accurate figures?

Mr. HAYS. There are some classes of the reporters that have underestimated at times.

Mr. BOWIE. Yes; and some who have overestimated.

Mr. HAYS. Yes, some have overestimated; and those have been corrected more by the traveling agents—the men who went out and looked over the whole situation—than by any other agency.

Mr. BOWIE. Is it not true, Mr. Secretary, that for the crop of 1904 the very best and most accurate reports you got were from individual planters, as shown by an absolute analysis?

Mr. HAYS. I have not in mind now just the analysis of that, but I remember that statement was made. Do you remember that particular, Mr. Olmstead?

Mr. OLMSTEAD. My recollection is that the individual reporters came nearer to the facts. That is my recollection about it.

Mr. BOWIE. Yes; I remember that is what Mr. Hyde stated from the records that were furnished a year ago to this committee, and the very best reports we got from the individual planters themselves.

Mr. HAYS. Well, you see, it is not the fault of anyone, particularly, but you can see when there is a whole people taking part in a movement—somebody has used the word psychological—it has had a psychological effect; but that is in the past, and we are trying to avoid any such situation again by the methods we are adopting.

Mr. BOWIE. Right at this point, if it does not interfere with your statement, could you give us a statement, or have you one available, showing the actual results of the Department estimate on the 1st of December for the past six years, as compared with the final results as shown by the Census Bureau, in pounds?

Mr. HAYS. No; I have not that with me, but in a general way I could tell you that it came, on an average, I think, within 1½ per cent, as we figured it. It would have been very close if it had not been for the wrong estimate of 1904. When the private agencies of this country and the public agencies, in a way, though not so extensively, had prepared the market for a belief that there was something like a 10½-million bale crop, and when the figures were brought together by Mr. Hyde, as we have the record now, there was evidence from the South of the true facts. There was no bias apparently in the evidence at that time, and it represented something like a 13-million bale crop, as I remember. Mr. Hyde, knowing about what the general feeling was as to the size of the crop, that the public did not realize it was so large a crop, sort of split between, as it were, and put it at 12 million bales.

Mr. LEVER. He did have the nerve to tell the truth.

The CHAIRMAN. I suggest that Mr. Hays be allowed to go on and make his statement, and members wishing to ask him questions can make a note of them. A question interjected now is hardly in line with what Mr. Hays is talking about, but may be later on. Members can make a note of what questions they want to ask. Let Mr. Hays make his full statement in regard to the reorganization of this Bureau and then we can ply him with all the questions we can get together.

Mr. HAYS. Mr. Chairman, your plan would much expedite the time required. So far as I am concerned, I have my notes here in consecutive order, so that these questions will not disturb me.

The CHAIRMAN. Asking questions this way will put on the record something not germane at that particular point.

Mr. HAYS. Just as you please.

To resume, if that one wrong estimate were left out the estimates on cotton would be quite close.

Mr. BOWIE. The reason I ask you the question is this: My understanding is that the record shows that for the past six years, taken as

a whole, consolidating them, the estimate was within seven-tenths of 1 per cent of accurate, and that you overestimated in 1903 practically as much as you underestimated in 1904, and that if you had followed the reports of the individual planters in 1904 you would not have underestimated at all. That was my understanding, and, furthermore, that in 1904 the condition reports issued by the Department showed practically the 13-million crop all through the fall of the year, showing that your correspondents had reported the truth to the Department all the time substantially.

Mr. HAYS. Yes.

Mr. BOWIE. That, I think, a study of the record will disclose.

Mr. HAYS. I might say in regard to the accuracy of the statistics that their basis must necessarily be on the census. The census makes an acreage count. It makes a count of live stock. With those bases for the different crops and different kinds of live stock, the methods that have been in use are fairly accurate. The methods we propose, though no radical change, will be much more accurate, and for market purposes will be accurate enough generally; and allow me to say in that connection that I have become a firm believer in the wisdom of spending sufficient money—six or seven hundred thousand dollars, as estimated by Mr. North—for a census of acreage and live stock the fifth year after the regular census.

Now, as to the use of statistics. It has been a very novel experience for me to sit at one end of the wires and see how the effect of tickling the wires was taken at the other end where the market was located, and I have learned some things about that of interest.

I have learned, for instance, very clearly a matter that farmers generally do not fully comprehend, that the area of a crop in the entire world and its condition go together to make up the factor of what the total production will be that must be taken into account by those men who are pitted against each other in buying and selling in the great markets, to blend these together into a market situation daily, and I have realized that we, on this account, need statistics made by a disinterested agency, which are so made, under such safeguards, with such a sensible and effective plan that they will not only be right and efficient, but will come near the truth and be as often above as below the real figures that may come out later to credit or discredit them, so that the whole public will accept these and be guided by them, and that they will not be subject to manipulation by interested influences.

There are some elements of any plan that are very difficult to work out, and I do not pretend we have anything like completed the details of a plan. That must come with experience. But so far there has been a very large amount of experimenting on methods, and we have simply studied these experiments and are blending together the elements that seem to us most useful in a new plan.

The immediate reorganization which we deemed wise, and as now appears to have been wise, was to increase the number of field men, the men who travel and know the agricultural conditions of each locality for which they report. We increased the cotton experts in the South from 1, covering fourteen States, to 3, covering five, five, and four States, respectively; and these men have been very useful to us. The crop-reporting board was also organized.

We digested, so far as we had the time and could get the material, the results of previous reports for years back, so as to better interpret

the present conditions in view of reports and the facts on which they were based in the past. You remember Mr. Hyde had all of this information in his own hands. He was the man, when he was here, who made the estimates, who carried this class of facts, these comparisons, in his mind through a series of years, and we were men who came on this board not trained by long experience in his work, so we dug up everything we could find that guided him, and saw his results, that we might compare them with such results as the ginner's reports in cotton, so as to train ourselves in the methods of getting at the facts out of figures as presented by the reporters, and we have needed these facts this year.

I found that the Weather Bureau crop reports and the crop reports of this Bureau were not worked up in any coordinate way, and I at once began arrangements for utilizing the information gotten through the Weather Bureau from its correspondents, and making that information useful to this board. We digested the reports of the Weather Bureau in its weekly reports for our monthly meeting of the board. Henceforth we expect to have the chief of the division in the Weather Bureau who gets out these reports meet with the crop reporting board as an advisory member.

Mr. BOWIE. Will you please state the organization of this statistical board? I do not remember that you have done that. How is it organized and what is its personnel?

Mr. HAYS. The board is made up of five members. The chief of the Bureau is the chairman. Then for each month he chooses four men from among the division chiefs and experts of the Department, sometimes bringing in some of the traveling agents to make up the board for each report, and also to give these traveling men experience in the methods of the board and let them see how this work is done at this end of the line. That board has been a very great educator to all of us. It has brought about discussion, as Mr. Bowie knows. He has participated in the work of that board. That is, he sat with the board.

Mr. BOWIE. On one occasion.

Mr. HAYS. Yes; and Mr. Burleson, who is present, was with the board at one time.

Then we began to look at the matter of State agents. We could not visit the county agents and all these local reporters. There were too many. We had supposed the State agents were doing their work well, and we found a great many of them doing their work very intelligently. A few of them did not have very good plans within the State, and by inspecting those State agencies, improved their work, and have improved the rules for agents of that class.

We have gotten along fairly well for the year, so far as the reports are concerned. We have been under the condition of being "damned if you do and damned if you don't," and evening up the damns, and not caring much, as long as we felt we were right. But we have gotten along fairly well as to the way the reports of the year have been accepted. We do not know how they will compare with any final figures like ginner's report, that we will run up against later; but the board has been fairly well satisfied with the results of the figures it has put out, and still has reason, so far, to feel fairly well satisfied.

Mr. BOWIE. Right there, do you not think, Mr. Hays, that the Department estimate of December 1, as shown by the latest ginning reports, will be within 2 per cent of accurate?

Mr. HAYS. That was true the last time I made an estimate in my own way. I am not so well acquainted with cotton as some of you gentlemen who have studied it more, but I think we are quite close in cotton—probably within 1 or 2 per cent.

Now, as to the matter of a plan for permanent reorganization, if you may call it reorganization. We propose to retain the crop-reporting board. It is a safeguard. It is a means of education; a school of methods. That is, it is a safeguard against leakages, and it is efficient for the duties it will have to carry out. It will not be so much an estimating board hereafter as it has been. It will be more exclusively a computing board. It will get reports that are digested better before they come to the board.

We propose to retain reporting at the Bureau in Washington the 2,800 county correspondents throughout the country, each of these to have some aids in his county.

We propose to merge the other agencies, under a system of forty-one district chiefs—that is, to have districts coordinate with the districts presided over by the section director of the Weather Service, who publish weekly reports from large cities mainly by States. These districts do not run by States exactly, but in some cases they include more than one State, as in case of all of New England, where the weather-section director is at Boston, and our district chief will be at that place and will report for the New England States. But in the great agricultural States there will be a weather officer and a Bureau of Statistics officer at the same city reporting for that State.

We then expect to have several supervising inspectors who will travel over the country. At first we may have them help make estimates until we get the other service well organized.

Mr. ADAMS. Just a moment, Doctor. You say you have 2,800 county agents?

Mr. HAYS. There are 2,500 now, as I remember, but there are about 2,800 agricultural counties.

Mr. ADAMS. And you say you expect to give them some assistants in those counties. Do you mean to keep up the old system of three assistants, local agents, subordinates of the county superintendent?

Mr. HAYS. We will not necessarily retain just three, but let each one have a number of agents, such a number as are convenient to him, probably a minimum of three; and we will not pay the county agents nor their aids. Neither will we pay the aids of these district agents, under that plan.

The purpose is to have these supervising inspectors visit the district agents, instruct them in their work, inspect their work, and when a district agent has a difficult problem which he has not the time to work out to send a supervising inspector there and let him stay until it is worked out. For instance, in the case of rice, the acreage of which was practically moved from the States along the Atlantic coast to Louisiana and Texas, there was difficulty for agents reporting from the Atlantic Coast States to reduce the acreage as rapidly as it should be reduced, and the agents in Louisiana and Texas were under the difficulty of increasing the estimates of acreage as rapidly as it was increased there. There are a great many cases

in which some special work of that kind will need help from the outside, where the district agents could not take care of all the work.

The county agents will get returns from their aids and will report by mail to Washington. These reports will be tabulated under what may be known as the bisected plan, to insure secrecy on crop-reporting day, or in some cases we might not even have those reports come to the Bureau until after crop-reporting day, because our main purpose is to check up the district chiefs and in some cases, if we care to have them come earlier, to use them along with the reports of the district chiefs and combine the estimates of the county agents with the estimates of the district chiefs.

The district chief is to have township agents and such other aids as each district chief may choose. He will travel over the State, say, three-quarters of his time, choosing these men, picking out good men, and by personal acquaintance securing from the best men of the community what may be called man-to-man information. These aids will report to the district chiefs about five days before crop-reporting day in Washington. This will cut the time down from eight to ten days, as now, to four or five days. The mail from these men to the district agents will only have to traverse a State. Now they have to traverse long distances. These district chiefs will then return to their offices, where they will be provided with assistance; and I am assuming that you are going to finance this plan.

They will return to their offices, where they will have an office clerk who can help at that time to tabulate and who at other times will be taking care of their correspondence; and twenty-four hours before the hour of reporting the crop in Washington they will send, by wire, their messages to the Secretary, these to be under a cipher. We have devised a system of cipher codes under which we can have, this month, one person send out the kind of code to use, next month another kind, separately arranged for each chief if we need to do that, and each man will thus use his own code for that month. These cipher messages then will come to the Secretary's office and be put in a safe and kept there until the board is in session, then opened by the board and tabulated under the plan of weighting by acreages or quantities in each State. These will be reported by States. Though these district chiefs, some of them, may have more than one State, they will report by States, so that there shall be figures for use within the State by the people of the State.

Mr. BOWIE. In other words, if a man finds out one code or one cipher, he only has that one? He has not the cipher of the others? You have a different cipher for each man?

Mr. HAYS. It will be a different cipher arrangement for each man. Of course nothing in ciphers is absolutely beyond people getting at them.

Mr. BOWIE. I understand; but they will have to work out eleven or twelve instead of one in order to read a result?

Mr. HAYS. Yes; in the case of cotton. These men, Mr. Chairman, you see, are all thinking about this being cotton all the time.

Mr. BOWIE. That is the thing I am thinking about.

Mr. HAYS. That is a good thing to center this discussion on, because if we can make a plan work in cotton, where there is such an intense market and speculative interest, we can make it work with the other crops.

Mr. LEVER. Would there not be danger of collusion between these district agents?

Mr. HAYS. Yes, but it would be very small; and we have got to trust men. We find in the Department of Agriculture, as you find everywhere, that we have got to trust men. There is no perfection anywhere.

The crop-reporting board will reserve to itself the right to change any of these estimates. It probably will not change them, as a rule, even though the county reports are somewhat different from those sent by district chiefs. The board will probably more highly accredit the district chief's report, because he can travel over the State and weigh the reports that come to him better than the board, at this distance, not having traveled over the area, can weigh these county reports that come to them. The district man will be under the necessity of having his reports, however, monthly compared with the county reports and having them at the end of the season compared with the ginners' reports, and with the commercial reports of swine or of cattle or of whatever check the board may find it possible to put on his report.

These reports will be published by the board, as formerly, under its plan for the entire area of the United States and also by States, and through our Division of Foreign Markets, where we can, we will be able to get world acreages and world conditions somewhat better than now. It is hard to tell how much that interesting phase of this question may develop.

This board will find ways of publishing the reports in good English. That has not always been done, and it has sometimes been confusing. The men who are learned operators on boards of trade are expert at interpreting language of crop statistics. The people generally need these statements in a simplified form, a form to which they are accustomed. And where it is practicable to use some scheme of putting the figures out as actual quantities, I believe that should be done. It can not be carried out in all cases. It can only be carried out in cases where the basis is right. For instance, there is a formula for putting the estimates out in bales of cotton. We now sometimes use the estimates because we have the ginners' reports to verify them, but as this goes along and becomes more accurate some formula can be used in many cases to reduce the percentages of different crops to actual or even prospective quantities. There has been a great deal said about the word "estimates," and that these were only estimates that we report. That is true; but when you get reports in from an efficient force of agents and they say that the condition is 79, that is a report of a fact. The estimate is when you carry it out, and the efficiency of the system of carrying out the estimates to the actual figures is a very important matter that is being investigated.

Now, as to the relations of the Weather Bureau at Washington and the Bureau of Statistics so far as the national reports are concerned. The Weather Bureau gets out a weekly report, not in figures, regarding crops, along with its weather report, and the Bureau of Statistics gets out a report in figures at the end of the month. We are finding ways of bringing these more closely into cooperation, so that the Weather Bureau will relate its reports to the Bureau of Statistics reports the first of the month rather than in so general a way to the

crop as a whole. The great trouble that the Bureau will always be under will be to prevent jars to the market. The more efficient the reports can be made the less that will be and the less excitement looking toward speculation, and the more stability of prices to the man who wants to buy for manufacture or for export. The more nearly these reports, as I look at it now, can be kept right up to date, showing changes as natural conditions make changes out in the field or showing actual quantities of crops produced, the more trade will be facilitated by it and the narrower can be the handling charges made by all those who deal in the products, leaving more to the producer and more to the consumer.

The Weather Bureau's weekly report in some modified form can keep the market in closer touch with the changing conditions until the next report comes out, so there is no radical shock. We can not reach any very great perfection, but certainly the method of stating these reports can be improved upon.

Now, within the States, this same thing is true. The Weather Bureau at Washington makes up its crop reports as based on the statements sent them by the section directors—these 41 men throughout the country. These men can be in cooperation with the district chiefs of the Statistics Bureau, and can have their aid in making up the weekly weather statement in its relation to the weather that is sent to Washington; or, in some cases, if the district man is out in the field, his statement can be wired to Washington. All those details have not been worked out as yet. Professor Moore says he wants to have the matter so that the crop statistics work is largely done by the crop statistics man; but just how that will be arranged will be worked out with experience.

You will understand that this changed plan will have to be worked out, requiring some time, and with care. Where practicable, it would seem that we ought to have agricultural college graduates for these district chiefs, where we can find men of that class who have the instincts for statistical work. They would in many ways cooperate with the college and stations of that State, and with the officers of this Department who may be working in that State along other lines. They could attend the agricultural meetings and there get in touch with the best class of aids, and if they can take part in these meetings they would gain a respect for efficiency and interest in agricultural work that would bring to them a better class of aids.

You will observe that under this plan, instead of the State man, as now, feeling that his report is to be revised, these district chiefs will feel that their reports are to be used and that they must be responsible for them. It makes it a matter of personal responsibility more clearly placed.

I might refer briefly to the general organization of this Bureau. We have an office of chief of Bureau. It is not filled at present. I am serving in that capacity. We have an associate chief and a chief clerk in the general office. Then, we have this crop-estimating board and three divisions: the Division of Domestic Crop Reports, which handles all the business with these district, State, and other agents, and sends out all schedules, receives all mail, and at times between the monthly period when these reports are being digested, these clerks do work for the other divisions of the Bureau and for other

bureaus, as the Forestry Service, the Bureau of Chemistry, the Bureau of Animal Industry, etc.

Mr. ADAMS. Doctor, do the members of this board receive any compensation other than their regular salary?

Mr. HAYS. No, sir.

Mr. BOWIE. Those who come in have their expenses allowed, as a matter of course?

Mr. HAYS. They are traveling men, who are always under the rule of having their expenses paid.

Then, there is the Division of Foreign Markets; and I may say, Mr. Chairman, that is a very efficient division, as many of you know. It has not only an excellent chief, but it has a group of young investigators studying foreign markets, who are doing a good work and a useful work. Then, we have another division called the Miscellaneous Division, in which the extensive library of the Bureau and special investigation are carried on. It is my hope that this division, under some better name, possibly rural economics, with a group of investigators, investigating the relations of the farm to outside affairs, will develop into a very efficient, and to me, probably the most interesting division in the Bureau. We have not done much in that bureau this year, for the reason that we have reduced the force there to use the money to increase the traveling inspectors, so as to better insure better crop reports for this year.

Now, Mr. Chairman, I have made a general statement. I would be glad to answer any questions.

Mr. BOWIE. May I ask you to state—I did not catch it as clearly, perhaps, as you did state it, but I think it will do no harm to restate it—exactly your method for preserving the cotton reports from leakage, the exact plan that you operate under, so as to put it in the record—your present plan as contradistinguished from what you did formerly.

Mr. HAYS. Do you mean the plan we operated last year, or that we propose to operate?

Mr. BOWIE. The plan you operated on, for example, in December.

Mr. HAYS. The reports came from township agents, county agents, State agents, and in some cases we had reports from other classes of agents, and also from traveling agents. The State agents and the traveling agents telegraphed their reports. The others sent their reports to this Bureau, where they were tabulated.

Mr. BOWIE. When did the State agents telegraph their reports?

Mr. HAYS. A day before.

Mr. BOWIE. One day before?

Mr. HAYS. Yes; just in time so they could be opened by the board. These reports, and also written statements that they sent with them, came to the Secretary's Office and were put in a safe, no one but the Secretary and myself having the keys. These were taken to the board after the board was in session. The board was made up of five men, myself acting as chairman, and usually two of the division chiefs of the Department and two outside men.

Mr. BOWIE. When were those reports opened for the first time?

Mr. HAYS. After the board was in session.

Mr. BOWIE. When did the board meet; at what hour?

Mr. HAYS. From 8 to 9 in the morning, owing to the amount of work we had to get out before 12 o'clock; or in case of four o'clock

meetings, we would meet at 9, and take a longer time during the day.

The reports from the townships and county correspondents and some special correspondents were received some days before, and tabulated by groups of clerks. A part of the counties were tabulated on one part of the sheet, and at a certain point before the computations were figured out, the sheet was cut in two and numbers were put on them, known only to one person. In that way it was almost perfectly safe-guarded, so that the bisected sheets were brought to the board, and even some of the important States, as in the case of cotton, Georgia and Texas, even before they were carried out thus far, were taken and put in the safe in the Secretary's Office. Now, it is known by everybody that the county and the township reports are not taken entire by the crop estimating board. There might be an indication, of course, but even if some one had all of the figures from these, which it was almost impossible to get, they would not know what the final report of the board would be, because no member of the board knows what that is to be until the figuring is all done, within half an hour usually before the report goes out. And then the only chance for the report to get out after that, or an indication of it, would be a communication from some member of the board or some of the clerks in the room in which we work.

Mr. ADAMS. The board has in its possession all these telegrams and all these reports from all these agents, and having tabulated, classified, and examined them carefully and made, we will say, an average based upon these various reports, how far does the board go in the exercise of its judgment as to the correctness of those figures in varying them in publishing their final conclusions?

Mr. HAYS. They sometimes have varied them a good deal. They would not have been accurate if they had not in some cases.

Mr. ADAMS. You have all the definite, specific sources of information obtainable in exact facts and reports, and still you exercise judgment—

Mr. HAYS. Do not misunderstand me. We do not go outside of facts, but we weigh the information. We do not always average it between the different classes of men. We will, maybe, take even the highest one in some cases, and if we have additional information, as, for instance, from the ginners' reports of recent issue, we might even find that the whole of the report is too low for a given State, and raise it there. It is in the hands of the board to pick out in the most sensible way it can, and get the most sensible report it can out of the situation.

Mr. ADAMS. Taking the reports of your special agents on corn, your county agents on corn, and your district or State agents on corn, and your other correspondents, what relative standing do you give the value of those different reports, or do you not have any rule?

Mr. HAYS. We do not have any rule except this: That if any member of the board can give the board any reason why some State agent is specially efficient and a set of county agents have not been efficient during the preceding months, we will give higher credence to his figures and give less weight to the figures from the county agents.

Mr. ADAMS. You do not have any fixed standards of relative value of these different classes of reports, as related to each other?

Mr. HAYS. No; neither will we give these district chiefs instructions that they shall use those specifically. The district chief will be

responsible practically for the figures from a State, and if he knows facts outside of those from the several classes of correspondents, from his own travel and experience, he will use those facts also. Possibly he knows, from commercial movement, that there is an indication of a greater crop. It may be that his basic acreage in the spring was wrong, and if he uses these figures in a regular formal way it will come out wrong. He must use all kinds of information.

Mr. ADAMS. You have these 2,500 county agents who report to you. Do the same men, or another set, report to the State agent?

Mr. HAYS. They do not report to the State agents. They report in some cases to the State bureaus. There are, in some States, State bureaus.

Mr. ADAMS. But these State agents do have their county correspondents?

Mr. HAYS. Yes, sir. Mr. Olmstead, is there much overlapping there?

Mr. OLMSTEAD. No; there is no possibility of overlapping, because the aids of the State men are kept on record in the main office here, and we see to it that they do not have the same men.

Mr. ADAMS. You never have the same correspondents?

Mr. OLMSTEAD. We never have the same correspondents for the State man, as they are an entirely independent set of correspondents.

Mr. BURLESON. Professor Hays, you say the Department of Agriculture, or the Bureau of Statistics, would be benefited by having a more frequent standard of comparison than is furnished by the result of the decennial census. Do I understand that you want the Census Bureau to gather statistics, with reference to acreage and live stock, in which an element of estimation enters?

Mr. HAYS. If that were taken we would feel that we had a good deal of help to get our estimates better for the next four years.

Mr. BURLESON. You do not understand my question. Every ten years you are furnished with a standard of comparison by the result of the labors of the Census Bureau?

Mr. HAYS. Yes.

Mr. BURLESON. A bill was introduced by me two years ago, and reintroduced this year, providing for a quintennial census with reference to live stock, acreage, and cultivation, and the amount planted of the five principal crops. That is to be, properly, census work. The element of speculation or estimation is not to enter into that at all. It is properly census work. Now, would it be your idea that the Census Bureau should gather statistics in which the element of estimation would at any time enter?

Mr. HAYS. There might be cases where it would be quite proper for them. There is no sacredness about the method used by one bureau as compared with the other.

Mr. ADAMS. The point the gentleman makes—though perhaps it is not proper for him to ask this question—is whether the Census Bureau should do anything except make a census, i. e., whether it should enter the domain of speculation in the way of estimates or not.

Mr. HAYS. There is no doubt whatever in my mind that Congress, if they saw the whole matter clearly, would want to rather clearly divide the work of the two bureaus. It is an advantage to have the agricultural statistics in the Department of Agriculture. I do not care to go into details about it, but there are advantages in a good

many ways in having these agencies throughout the country, and the Secretary has taken a great interest in these statistics and in having them right and in keeping them going, because he believes that the interest of the producers on the one hand and the ultimate consumers on the other, who are usually private individuals, with their interests not merged, are conserved by a broadly and accurately kept system of crop reports.

Mr. BURLINSON. Evidently, Mr. Hays, you do not understand my question. The question is this: You suggest that you would like to have a more frequent standard for publishing by the Department a quinquennial census of acreage in cultivation, of live stock, and of the number of acres planted in cotton, corn, wheat, etc. That would be actual enumeration by the Census Bureau of the acreage planted, which Mr. North estimates would cost about \$600,000. Would it be your idea that the Census Bureau should annually attempt to estimate the number of acres, not by an actual enumeration but by estimation?

Mr. HAYES. I see your point—whether under their organization they could not get some way of extending the estimates of acreage annually and let us have that annual statement for our other estimates. I have not thought of it in that way before, but it looks to me to be a matter of both economy and efficiency to use the system that is now used and the agencies now in use in the Department of Agriculture for getting the acreages. I think if we have an acreage every five years we can get the annual acreage for the next five years by the system in use pretty accurately. Of course the error toward the end of the five years is multiplied somewhat, and it is quite difficult, using all the checks we can through the five years, to check up and get the estimates quite accurately; and sometimes the board in its discretion, and these district chiefs in their discretion, can base the total figures of crop produced or live stock produced from the commercial movement, from the movement of the crop previously in commerce, and not base it so absolutely on acreage as you might expect. These are estimates. You have got to use all available information, and work in as much of scientific and mathematical method as you can and as is right to use.

There is another matter that I did not speak of in that connection. If we can build up a corps of district chiefs, and of supervising inspectors, and of investigators in these other two divisions, we will have a corps of men from among whom we can have specialists in commercial movement and in other methods of studying these problems. For instance, if we can have a man on wheat, he can know the commercial movement of wheat. He can know the history of the commercial movement of wheat. He can know the factors which induce farmers to plant more wheat or less wheat during a given year. He can know in a broad way for the whole country and for the whole world. Possibly we can have a man in the Division of Foreign Markets who is a specialist in foreign wheat statistics, and another man who is a specialist in this. Do not understand that I am suggesting another class of officers. I am suggesting, rather, sideline specialists for the men in this service, and each man picking up some specialty like those mentioned, and working at it in a broad way will secure the best kind of education to train him to make the estimates for a State or to act on this board. It will be much more of a

school. It will be a school of bright men. This service ought to pay salaries to men who would meet the requirements I have been talking about.

Mr. FIELD. In your plan of reorganizing the Department you contemplate certain changes to be made in acquiring statistical information. I speak now particularly with reference to cotton statistics. I understand you propose to increase the number of special agents, for the reason that the large number of reports that you get from the citizens of the several sections you do not regard as reliable as those you get from the source of your special agents.

Mr. HAYS. Let me state that a little differently, Mr. Field, if you please. We find that of a class of reports coming in for a given State from different classes of correspondents they will vary somewhat, as do the length of my fingers. We have to find an average. At present the board finds that average. We put the figures for each State in four columns, so that the man has a figure here from Alabama, from the township men, the county men, the State men, and the traveling men. He must resolve that into a single figure.

We make four of those sheets with columns on them and lay them before four men at different tables. They are passing judgment individually. Those four sheets are given to a clerk who resembles the results of those four columns made by these four men on another sheet, and that is given to me. I place that on the table and these men take their own sheets, and we sit around the table. Where they are all 79, we put it down 79—where one is 78, one 79, one 79, and another 79, we would average it at 79. If the men are very far apart we talk it over. If some member of the board has made a radical change, if he has taken the highest figure of this agency—possibly the State man was the highest, or the traveling man was the highest, and he has some reason why that man's figures should be taken—he justifies it at the board, or if he can not justify it the board overrules him, or maybe accepts it and makes it an average.

The CHAIRMAN. Do you apply that to your estimate on acreage and on condition?

Mr. HAYS. We apply it to any figures we are working at, and that work, I will say to Mr. Field, will now be done not by the members of this board, who do not know the local conditions nor the local men, but will be done rather by the man in the field, who is chief of the district and who knows his different agencies, and he will do it by counties. Now and then he will, by weight averages, assemble the percentages for all the counties into a State average, and telegraph that to Washington, and unless we have special reasons for doing so we will not need to revise that. It will be getting the information closer to the real facts by men who know the local conditions. That is not anything new. That has come out of the actual experience of the board in seeing how these agents got at their information.

Mr. FIELD. So that you think it would be well to strengthen on that line the special agents rather than the reports you get generally?

Mr. HAYS. Yes; and not to make this change too rapidly or too soon, but to retain enough of the old organization until it is well arranged.

Mr. ADAMS. You say you have 42 districts now?

Mr. HAYS. No; there are 41 of these weather districts. We would not probably undertake to put all of those into operation at once. We might even combine some.

Mr. ADAMS. Why have you dropped the State organization and taken up the district organization? States are more homogeneous, and there are more of them.

Mr. HAYS. There are more of them. You would not want to put six of these district agents, whose expenses for traveling you would have to pay and supply an office and office help, in each of the New England States, when all of New England agriculturally is not larger than a good many single States.

Mr. ADAMS. You have traveling agents in addition to your district agents?

Mr. HAYS. We plan to have four or five traveling inspectors.

Mr. ADAMS. But your district agents do not travel, do they?

Mr. HAYS. Yes; these district chiefs would be in the field three-fourths of the time.

The CHAIRMAN. They travel within their district?

Mr. HAYS. They travel within that State, practically, if their district is a State, but they do not travel over a number of States, except in case where the district covers more than one State.

Mr. BOWIE. It is contemplated that they will generally cover a State?

Mr. HAYS. Generally. All the large States will have an agent. Possibly Texas will have two agents.

Mr. ADAMS. What is their compensation?

Mr. HAYS. That has not been decided upon. It will have to be decided upon, in the first instance, partly by the available means for it that you may provide, and partly by the individual situation in life of those men who must be secured, who have instincts for this work and have an acquaintance with it, and a standing so that everybody will believe them.

Mr. ADAMS. Under the old system they did not receive salary enough to enable them to travel?

Mr. HAYS. That is true, and they did not receive any money for traveling. Some of the best money we put in this last year has been the traveling expenses of the traveling agents. They have helped us greatly at the end of the month to tell what the facts were.

The CHAIRMAN. Professor, you estimate your acreage; then you estimate your conditions. Now, how do you arrive at your crop?

Mr. HAYS. That is a very interesting thing, Mr. Chairman. If I had a blackboard, I could show you. If you will take the cotton crop for the last ten years and average it, you will get, we will say, an average of 9,000,000 bales. I do not know how it will average, but it will vary for different years. Now, if you will take the percentages that this Bureau has been using for at least six years—I do not know that we have compared it for a full ten years—and average that for the years, and then take the percentage that we find at the beginning of any month for the last year, and then, just by using the rule of three, extend that, you will get approximately the acreage promised by the present outlook in terms of the average promise for ten years, figured into the actual product for ten years, and it will come out somewhere nearly accurate.

For the present that is the closest we could come in putting the estimate into figures. It is simply a matter that the board ought to decide in each case, as to whether it had better leave it in percentages or whether it had better extend it under some certain scheme of figures.

Mr. ADAMS. Mr. Chairman, I would suggest, as there are a number of gentlemen here, outside of the committee, interested in this subject, that they be invited to ask such questions of Professor Hays as they may desire to ask.

The CHAIRMAN. Let him finish answering my question.

Mr. HAYS. What further point had you, Mr. Chairman?

The CHAIRMAN. Then you arrive at a general average, say, for example, ten years on your acreage?

Mr. HAYS. No; not the acreage. Do not think of acreage now. Think of the product for each year, not the acreage for each year. I will ask Mr. Olmstead to state that. I am just a little mixed on that one point. Mr. Olmstead is the mathematician of the Bureau.

The CHAIRMAN. My question is this, Mr. Olmstead. You first estimate your acreage, then you estimate your percentage of condition. How do you arrive at your crop?

Mr. OLMSTEAD. At the end of the season we make a computed estimate of the crop.

The CHAIRMAN. What is the actual process of arriving at your crop?

Mr. OLMSTEAD. The actual process is this. At the beginning of the season we estimate the acreage planted. Later we secure from our correspondents information as to the amount of the acreage planted that has been abandoned during the year. We also secure from them the average yield per acre. At the end of the season this acreage abandoned, that we have ascertained, we deduct from the acreage planted, which leaves the acreage harvested. There we have our acreage basis. We apply to that the average yield per acre. Multiplying the average yield per acre for each State by the acreage harvested for each State gives us the whole crop for each State. That is the whole process in December.

The CHAIRMAN. What does condition have to do with that?

Mr. OLMSTEAD. What Professor Hays had reference to was our condition estimate during each month, and he had reference to a formula in resolving those condition figures into a statement of promised yield of total crop.

The CHAIRMAN. I should think a condition percentage would have a good deal to do with the amount of crop.

Mr. OLMSTEAD. It does. It constitutes really a forecast of the crop, and the only object of it is the indication as to what it gives.

The CHAIRMAN. Do you have that estimate of condition, or do you rely absolutely on your estimate furnished by your field people?

Mr. OLMSTEAD. That estimate is furnished by the field people. We get that from month to month.

The CHAIRMAN. Which do you rely on?

Mr. OLMSTEAD. During the growing season that is all we have. At the end of the season we rely on this method I have just explained to you.

Mr. HAYS. Mr. Chairman, let me explain. You are not quite understanding each other. At the end of each month we get out a

condition report. At the end of the season we get out a report stating the amount of the crop. Now, there are two questions. One is, how can these condition figures, at the end of the month, be projected into promised crops, stated in quantity? The other is, how do we arrive at the actual figures for crop, as we have been following the practice, to get at that one figure that we give out on the 1st of December. Mr. Olmstead will tell how that formula is used. For instance, take the figure 79 at the end of the month.

Mr. BURLESON. That is not what Mr. Wadsworth asked about.

Mr. OLMSTEAD. Mr. Wadsworth, as I understood it, wanted to know how we arrived at a forecast of the probable crop from the reports of condition received.

The CHAIRMAN. Condition and acreage.

Mr. OLMSTEAD. Acreage is another matter. That is established at the beginning of the season.

The CHAIRMAN. You must take both into consideration in arriving at your crop.

Mr. OLMSTEAD. We do. I will explain that to you. I spoke of July or August. The figure fixed upon by the crop reporter and estimating board of the condition of cotton is 79, for example. We take that 79 and we ascertain from tables we have the average condition for the same month for the last ten years, which is as good a basis as we can get. Then we apply this formula: As the average condition for ten years for any given month is to this year's condition for the same month, so is the average yield per acre for ten years to this year's yield per acre. That gives you the formula. Now, having the yield per acre, you can easily figure out what the promised crop is.

The CHAIRMAN. That is all right. I understand that.

Mr. LEVER. Just one moment, Mr. Chairman. I would like to have Mr. Olmstead answer this question: For instance, you report your crop condition as 71.

Mr. OLMSTEAD. Yes.

Mr. LEVER. But at that time you do not estimate what that condition would mean in actual bales?

Mr. OLMSTEAD. We never have. We have never expressed that quantitatively. We have always given the figures out by condition, and people have worked it out to suit themselves.

Mr. LEVER. In your condition estimates, then, you leave the public to draw its own conclusions as to what the crop will be?

Mr. OLMSTEAD. That has been the custom heretofore.

Mr. LEVER. Would it not be better for you at the same time when you state your estimate of the condition to also state your estimate in actual bales upon a condition of this kind?

Mr. OLMSTEAD. That is a matter of personal opinion. In my opinion it would be the proper thing to do.

Mr. LEVER. That is your opinion?

Mr. OLMSTEAD. Yes, sir.

Mr. LOVERING. To give out the reports at that time?

Mr. OLMSTEAD. To give out the probable crop, the promised crop, because that is all the figures are for, anyway.

Mr. LOVERING. Mr. Chairman, may I ask a question?

The CHAIRMAN. Certainly.

Mr. LOVERING. Following out that course of reasoning, and every one making his own figures on the condition and acreage, as you

have given it, I find that according to a report which has been made that in August, 1903, the crop amounted to 9,900,000 bales. In September, the next month, that jumped up to 11,800,000 bales. Then in October it fell to 10,100,000 bales.

Mr. OLMSTEAD. I can not explain that to you now.

Mr. LOVERING. That is enough to demoralize any market in the world.

Mr. OLMSTEAD. While we have never published these quantitative forecasts—it has never been done—we found by actual tests that in nearly every case it works out accurately. Last year, for instance, these condition figures, received from month to month, indicated a certain crop, and the last report received, the October report, indicated a crop of over 13,000,000 bales. That was not published. As a rule that works out correctly. In some particular year there may have been some blunder made in an estimate. I do not know about that. That was before my time. I can not tell you anything about that, but I know by actual demonstration, working it out myself, that as a rule that formula is reasonably accurate.

Mr. BOWIE. Mr. Olmstead, the 1904 condition reports for August, reduced to a quantitative basis, showed 13,000,000 bales; for September, 13,400,000; for October, 13,300,000—all close to the final yield.

Mr. OLMSTEAD. Yes.

Mr. BOWIE. Now, every one of those reports was made by your present organization.

Mr. OLMSTEAD. Is that the crop of 1904?

Mr. BOWIE. Yes.

Mr. OLMSTEAD. That was made by Mr. Hyde, but under the present system.

Mr. BOWIE. He based it on these reports?

Mr. OLMSTEAD. That is correct.

Mr. BOWIE. Those run close together at that time. This jump, from August, 1903, to September, 1903, amounting to a difference of 1,900,000 bales, was the time they broke Sully, was it not?

Mr. OLMSTEAD. I think it was about that time; yes, sir.

Mr. BOWIE. And there was evidence last year of manipulation of the acreage reports by Mr. Holmes, for which he is now under indictment.

Mr. OLMSTEAD. That is true.

Mr. BOWIE. And there is a possibility that there may have been manipulation in September, 1903?

Mr. OLMSTEAD. Yes; because that is such a variation from the general rule as applied to this thing that it is very apparent.

Mr. BOWIE. Let me ask you another question. When you really come down to it, do you not really think it would be an unsafe thing for the Department to put out a quantitative report six or seven times during the year?

Mr. OLMSTEAD. Well, I do not know about that, Mr. Bowie. The only object in view in publishing these condition figures at the end of the month is to furnish the public with some sort of a guide as to what the crop is going to be.

Mr. BOWIE. They have already got that, and they are accustomed to the percentage basis.

Mr. OLMSTEAD. Yes.

Mr. BOWIE. And they understand that is purely a question of condition?

Mr. OLMSTEAD. Yes.

Mr. BOWIE. But the very minute you reduce that to a quantitative basis, you would have them making six estimates a year instead of one.

Mr. OLMSTEAD. As I said, that is a matter of opinion.

Mr. LOVERING. I would remind Mr. Bowie that Sully was broken in March, six months after the time he named here.

Mr. BOWIE. They broke the market all to pieces.

Mr. ADAMS. I have seen the wheat crop of the whole State go off 50 per cent in thirty days.

Mr. OLMSTEAD. Here is another thing to be said about that. The condition of any crop may deteriorate during any given month, and the condition may be shown, and it may improve, so a different condition may be shown at the end of the next month. It may fall back and then build up again.

Mr. LEVER. I would like to ask Mr. Olmstead this question: In your October estimate of condition your percentage is 71.2?

The CHAIRMAN. That is 1905, I suppose?

Mr. LEVER. 1905; yes. Will you please state just what that means?

Mr. OLMSTEAD. That means that the condition of the growing crop gave a promise of 71.2 per cent of a full crop, represented by 100.

Mr. LEVER. That may mean a crop of 12,000,000, 13,000,000, or 9,000,000?

Mr. OLMSTEAD. It would be on the acreage.

Mr. LEVER. Does that mean so many per cent of an average crop of ten years?

Mr. OLMSTEAD. No, sir; a full crop is such a crop as would be produced in any locality, State, or community under favorable circumstances, free from insect pests, bad weather, or anything else. It is what every man has in his mind for himself, grown on a farm in his county. One hundred represents a full crop.

Mr. LEVER. Upon this October estimate of yours the cotton market broke \$8 a bale, a loss of \$8 a bale to the producer of cotton, the bears estimating that crop upon that condition as amounting to 11,800,000 bales for this year's crop. Is not that true?

Mr. OLMSTEAD. I do not recall whether that is so or not. It probably is, if you have it there.

The CHAIRMAN. Mr. Olmstead, you say that in arriving at your conclusions you deduct the number of acres abandoned. Now, this estimate does not show that in 1905, because in the note it says: "Probably it would have been better if an allowance for an abandoned acreage, placed on a ten-year average, had been made."

Mr. OLMSTEAD. That formula I gave you has been worked out on the planted acreage, because we do not know the abandoned acreage until December, and these reports are given in September. That is one argument against putting out a quantitative basis.

Mr. LEVER. But in putting out your condition basis you have the same trouble—that you allow the public to draw its own conclusion without any definite figures from you.

Mr. OLMSTEAD. Well, the public has in mind, as Mr. Bowie says, what these figures mean. The people who are interested in this thing

and study the figures and keep track of them know what the figures mean, what their significance is. I gave my own personal opinion about the matter, and I said it was a personal opinion, because there are different views on that question.

Mr. LEVER. Your idea is that the condition estimate ought to be followed by the quantitative estimate?

Mr. OLMSTEAD. I think it would be a good thing, for that is the only object of the estimate.

Mr. SIMS. Mr. Olmstead, as I understood you, your individual opinion is that, following each condition report, there should be a report saying what that would indicate in yield if this condition was maintained?

Mr. OLMSTEAD. Yes, sir.

Mr. SIMS. You have just stated, what is entirely correct, that your abandoned acreage is not ascertained until the end of the year.

Mr. OLMSTEAD. Yes, sir.

Mr. SIMS. Consequently every one of these reports, giving out so many bales indicated, would be based upon the acreage planted, and necessarily would be in error to the extent of the abandoned acreage.

Mr. OLMSTEAD. Some little; yes, sir.

Mr. SIMS. The people are used to thinking of this in the concrete form, the number of bales, and as conditions may change 10 or 15 or 20 per cent in a month by drought, more or less extensive, and further including this abandoned acreage, not knowing what it will be, would not these reports necessarily be in error to that extent and cause wider and more dangerous fluctuations?

Mr. OLMSTEAD. I do not know that they would be. There would be some little element of discrepancy, because they are simply estimates anyway, and an estimate, in the nature of things, can not be an enumeration. It is not exactly accurate. It is accurate, within bounds, but we have found by actual computations for a series of years that a formula used in the way Professor Hays explained to you works out pretty nearly to the crop as subsequently ascertained. It is a pretty safe guide.

Mr. SIMS. Is it not a fact that the July condition, which is really the June condition—

Mr. OLMSTEAD. June 25; yes.

Mr. SIMS. Might be 95 per cent?

Mr. OLMSTEAD. Yes.

Mr. SIMS. That, maintained throughout the year, would be practically a maximum crop?

Mr. OLMSTEAD. Practically.

Mr. SIMS. But maybe the 1st of September is 70 or 79. It goes out in July that the indicated yield is 15,000,000.

Mr. OLMSTEAD. That is what that 90 means.

Mr. SIMS. And then the following 70 lowers it?

Mr. OLMSTEAD. Yes.

Mr. SIMS. And the people are used to thinking of bales more than they are of percentage condition. Would there not be an element of danger? In other words, would not the crop reports or estimates cease to have the weight they do now by their frequency and the amount of error that would necessarily come in by reason of including abandoned acreage before they are ascertained?

Mr. HAUGEN. In making estimates of percentage, do you also make an estimate of the acreage?

Mr. OLMSTEAD. Not during the growing season; no, sir.

Mr. HAUGEN. Of what value, then, is your estimate?

Mr. OLMSTEAD. Of condition?

Mr. HAUGEN. How can you estimate the number of bales unless you have the acreage also?

Mr. OLMSTEAD. By the formula I gave you a moment ago.

Mr. HAYS. You did not understand his question. We do make an estimate of acreage, and make it at the beginning of the year, and use it until the end of the year, and then abandon it for any abandoned acreage. So we do use it every month.

Mr. OLMSTEAD. That is, we would use it until we make a quantitative estimate.

Mr. CLAYTON. Can you not ascertain the abandoned acreage earlier than December? For instance, could you not ascertain the abandoned acreage in June or July?

Mr. OLMSTEAD. I think not. I think the probability is there would be a good deal of acreage abandoned after those dates.

Mr. CLAYTON. Say after July 1.

Mr. OLMSTEAD. Probably so; yes, sir. Very likely so.

Mr. CLAYTON. You know the cotton is planted beginning in the latter part of March, and in April and May.

Mr. OLMSTEAD. Sometimes a flood comes along in November, or an early frost, or something of that sort.

Mr. CLAYTON. But you do not abandon acreage in July. You can tell in July whether a late frost had killed it.

Mr. OLMSTEAD. But an early frost might come in November.

Mr. SIMS. Suppose it did; it would not be an abandoned acreage. It might have cut the crop off some.

Mr. OLMSTEAD. It might be ruined. A flood might come and ruin a whole county.

Mr. SIMS. It is possible that a flood might, but in November a frost would not entirely ruin it.

Mr. HAYS. Mr. Chairman, may I make a general statement in that respect? By this district system of agents, if there is an abandoned acreage by the 1st of June or the 1st of July and another one by the 1st of August, it is perfectly within the sphere of these men to revise their own acreage, and to base their own monthly estimates on that. They will be out in the field, where they will know a good deal about these conditions. About this matter of the formula, this board is brought together as a school to study these methods, and all of these schemes for working out statements will be subject to being taken up and being adopted as they prove useful, and even to be experimented on if they are in some doubt. The public has the trouble, when using the percentages, of not knowing, in the first place, what percentage means.

It is only the few experts who know that; and, furthermore, there are still fewer who know that the percentages run down in a descending scale, based on the descending scale of the monthly percentages, which drops several per cent each month. This term "normal," which we are now coming to express as "full normal," means that the crop is all right in the spring; that the soil is in pretty good condition—

that is, in normal condition—and the scale slides down, as shown by the monthly averages of these percentage estimates, something like 4 or 5 per cent per month until the fall. As unfavorable weather, insect pests, and other misfortunes befall the crop, the reporters measure the chance the crop still has of making a full crop in the terms of percentage. The public do not interpret the figures, because of the descending scale, which I have mentioned. They have got to be interpreted in some way by the markets in the terms of that average, and, when properly made, that formula probably works out well. Of course it is subject to error. A phenomenal crop might make the error considerable, but it is probable that the board will find, when it has thoroughly investigated this matter, that projecting percentage estimates, according to some such formula that it may devise, and stating within what limit its errors may be, the public will receive better information by that method, by adding another column to the tables, than by any other.

Mr. LEVER. Mr. Secretary, before you take your seat, it has been suggested that this whole situation could be relieved by making your condition in words rather than in percentages. For instance, instead of expressing your crop in October as 71.2, you could say the crop is good and the condition favorable or unfavorable. I would like you to state to the committee your opinion as to that.

Mr. HAYS. I have never seen anything that would make me feel that would be at all practicable to anybody, either in the Bureau or out.

Mr. BURLESON. The terms would not be flexible enough?

Mr. HAYS. You can not average them. You have to use percentages.

Mr. CLAYTON. Percentage itself is a relative term, and the other would be a more indefinite relative term.

Mr. HAYS. I do not know how you could use it in the markets, I do not know how you could use it in the States in getting the information, and I do not know how we could use it in tabulating.

Mr. CANDLER. We could not bring all the statements together in one concrete expression to save our lives.

Mr. HAYS. No. We have taken the Weather Bureau general statements up with the board sometimes and have tried to analyze these statements for a given crop for the four weeks, to see at the end of the month what they meant, and they would not be interpreted the same as our figures at all. They would be interpreted either below or above, as a rule, and if our figures were at all right their figures would not tell definitely what the facts are.

Mr. BOWIE. Mr. Chairman, I suggest we give these gentlemen from a distance an opportunity to be heard and if we have further questions to ask the gentlemen from the Department they will be here where we can reach them.

The CHAIRMAN. I want to ask Mr. Hays one question. Looking at this report for June, 1903, your percentage of condition is 86. What is the unit upon which that is based?

Mr. HAYS. Where is that?

The CHAIRMAN. On page 16 of the report to the President by the committee on departmental methods. That is just an example; I have taken that one as an example.

Mr. HAYS. That is a ten-year average.

The CHAIRMAN. That is 86 per cent, and it is for a ten-year average.

Mr. HAYS. That is 86 per cent of a full normal crop.

The CHAIRMAN. How do you arrive at that, taking a ten-year average?

Mr. HAYS. All the correspondents of the bureau have sent to them on the schedules, and sometimes on a separate slip of paper, a statement telling them what the normal means. We are expressing that a little differently from what it has been expressed. Every one of us would express it just a little differently, no doubt, but this is a remarkable thing that every man agrees on who has gone into the matter in detail, so far as I know—that in the minds of the people that on the average, or in general, it means a certain thing one year with another, and that it works out about right. I was astounded at that when I went into this matter. I thought that was a foundation that was not good, but the more I have seen of it the more I have become satisfied, not with its perfect accuracy, but that it is probably the closest method we can get. This has been in operation for forty years, and has stood the test of these investigations to my satisfaction as compared with any other plan.

Mr. LOVERING. But you have not yet answered the chairman's question as to how you arrive at that 86. What is the basis? What is the unit?

Mr. HAYS. Let me take the monthly condition, 71.1, just opposite that, for a given year first. That 71.1 would come to the board from the different classes of agencies—the township agent, the county agent, the State agent, and the traveling agent. There would be four or five figures. We will say one would report 68, another 69, another 72.

Mr. LOVERING. Sixty-eight what?

Mr. HAYS. It is really a percentage, giving the correspondent's opinion as to how much the crop had fallen short at that time of a promise of a full normal crop.

Mr. LOVERING. Of what?

Mr. HAYS. Of a normal crop, at 100. I can fully appreciate your trouble at understanding what that means.

The CHAIRMAN. What is the normal crop?

Mr. HAYS. One hundred.

The CHAIRMAN. One hundred what?

Mr. HAYS. One hundred per cent.

The CHAIRMAN. What does that mean?

Mr. HAYS. In the minds of these people it means this—

The CHAIRMAN. In the minds of people?

Mr. HAYS. Yes.

The CHAIRMAN. But it is not an ascertained fact then?

Mr. HAYS. It is an estimate of the crop expressed in percentage, if you please; and when they start in the spring, if their conditions are right for a crop, if the soil has been prepared well, if the season is early enough to be in the best season, if their seed was good, and if conditions were generally favorable, not in excess, but just a good, normal, favorable condition in the spring, when none of the insects and none of the climatic conditions had gone against the crop, they would call it 100. If it was very favorable, they would say it was above 100. It would be more than 100 per cent, and then a month

later, when they would report, if the weather had been very cold, in the case of corn, for example—and the seed of corn, as you know, is injured by very cold weather in the Northern States particularly, after planting time—if the conditions had been such that a great deal of the seed had rotted in the ground, they would cut off some. Maybe they would make it 80 per cent, or if no very serious injury had occurred they would more likely make it about 95 per cent if they started out at 100, because it usually runs down about 5 per cent.

Mr. LOVERING. Is not that according to the opinion of one man just at that time in each district?

Mr. HAYS. It is the opinion of the local man who makes the estimate.

Mr. LOVERING. He does not reckon it up as you do points on a bull pup, does he?

Mr. HAYS. No; there is no score-card business about this in that way. This works a good deal as a score card, but he does not enter into the difference. He does not give an item for soil, another item for climate, and so on.

Mr. ADAMS. You regard 100, then, as a fair average condition?

Mr. HAYS. A fair average good condition at the start, when it has not met any difficulties. Then it drops about 5 per cent in the average per month, because it meets its difficulties.

Mr. ADAMS. That is exactly what you mean by 100 when you say normal?

Mr. HAYS. Yes.

Mr. ADAMS. A good, fair, average condition?

Mr. HAYS. Yes.

The CHAIRMAN. But each man in each district decides that question in his own mind in sending in his report?

Mr. HAYS. Yes. Now, gentlemen, that is one of the things that needs to be slightly rearranged.

STATEMENT OF J. A. TAYLOR.

Mr. TAYLOR. Mr. Chairman, perhaps I can throw a little light on this question right here. It is very important, as Mr. Hays said just now, that there be a change made, possibly, in this one thing. I happen to be two of their correspondents—that is, I am on two different lists, and I answer these questions from time to time. I have investigated, with a number of other correspondents all over the section, in fact, wherever I go, and I do not find any two persons who agree on what a normal crop is.

The CHAIRMAN. That is what I was trying to get at, if there had been any agreement on what a normal crop is.

Mr. TAYLOR. That is one thing that should be attempted, and I think it has been suggested to the Department heretofore by Mr. Hester, the secretary of the New Orleans Cotton Exchange, and by other gentlemen who are pretty well posted, that this change be made, to base the condition on last year's condition, which we actually know; in other words, say our crop this year indicates 10 per cent less than last year.

Mr. ADAMS. What objection would there be to basing your estimate upon an average for ten years?

Mr. TAYLOR. It is pretty hard for the average man in the country,

who makes these reports, to understand what a normal crop is. He does not know exactly how to make his——

Mr. ADAMS. You would come nearer to it if you had some definite, specific thing upon which to base it.

Mr. TAYLOR. That is what I say. He knows exactly what the crop was last year. That is the reason I have made the suggestion to Mr. Wilson that he change it, and I think he is considering the matter now.

Now I wish to call attention to the fact of their October report on Texas.

Mr. HAYS. Mr. Taylor, let me make a statement while you are on that subject. That is a good suggestion, and we are ready for suggestions and have been ready all these months. We want some more of them. We may experiment on that matter. We can do it in a few States.

Mr. BURLESON. Let me call attention to the fact that when you abandon the present system you lose then the advantage of the comparison with all the statistics you have ever gathered.

Mr. HAYS. We can try that in a small State.

The CHAIRMAN. That is not quite so, Mr. Burleson. You can have last year's crop. You can take the statistics of 1905 and base your percentages on the crop of 1905.

Mr. TAYLOR. In regard to the condition report in October of this year on Texas, I think their condition report was 68, compared to 69 last year. The fact is there are about seven or eight hundred thousand bales less of cotton produced in Texas this year than last year.

Mr. BOWIE. A part of that was difference in acreage. It is not all a difference in condition.

Mr. TAYLOR. But 1 per cent, you know, added to the loss in acreage would not make this difference. There is a difference of about 30 per cent in the yield, and only a difference of about 1 per cent added to the decrease in acreage would make about one-half of what the actual crop shortage is. Now, on that theory we experimented, and I found that a great many correspondents actually do use the last year. For instance, we asked the ginner to report in July the condition based on normal. We asked them again in September to base it on last year's crop, and we practically got the same figures less the decline in the condition that your department reported, and this condition that they reported has actually turned out about what the crop is. So if you will consider that I believe it will be proper.

Mr. HAYS. It will be worth experimenting on, anyway.

The CHAIRMAN. Mr. Jordan, we would like to hear any suggestions you wish to make on this subject of statistics. I understand you have given the matter much thought. We would like to hear any suggestions you have to make on this subject of statistical information.

STATEMENT OF HARVEY JORDAN.

Mr. JORDAN. Mr. Chairman, this, of course, is a matter that the whole country is vitally interested in, as the question of the cotton crop is a national proposition as well as a southern question. I want to state right at the opening of this matter that so far as the people of the South are concerned they are all very much interested in both

Departments for the compilation of cotton statistics, the Census Bureau and the statistical department of the Agricultural Department.

This question has never come up for consideration in any large meeting of farmers which I have attended, when there was not a resolution introduced, and carried practically unanimously, for the maintenance of both these Departments. But what we do want and what we insist upon is that they shall be so guarded as to give to the whole country as nearly as possible absolute facts and the truth; and that such safeguards shall be thrown around the preparation of these reports as will take away any danger of their being used by speculative agencies throughout the country. For the last few years speculation in cotton has grown by leaps and bounds; and I believe it is going to such an extent that it will be a great deal in the United States.

The CHAIRMAN. Has not speculation grown in everything else, as well as in cotton?

Mr. JORDAN. It unquestionably has, and it is growing in the South very rapidly. They line up, in different sections of the country, on the days when these reports are to be issued, and sometimes when they are issued values are either increased or decreased millions upon millions of dollars. That condition of affairs is extremely hurtful to the business interests of this country. It appears to me, from what these gentlemen have said, that they plainly admit this whole system is largely in its infancy, or is at least in an experimental condition, and that they are working to arrive at the truth. What they desire is to get some method by which they make this work as perfect as possible.

It appears to me that the Department of Statistics could inaugurate a good system if they would adopt, to a certain extent, the plan that is at present pursued by the Census Department with regard to the different counties. Let them have one good man in a county and pay him for his work. I do not believe in the United States Government or anybody else asking the people to work for it without compensation. Pay these men for ten days' work in each month, and let them go around and practically see every important farmer in the county, gather these estimates, send them in to the Department under affidavit, and let them be kept in a book of record in the county. I believe that both Departments should abandon the maintenance of so much secrecy in connection with their work. This Government, as I understand it, is run for the people, and they are entitled to know just what method the Government employs and has employed, and also to know the figures used in reaching the different estimates. They should be open for inspection.

It seems to me that, through this county system, if the county reporters' work is open to the public, and these reports show the conditions by counties as well as by States, the Department of Statistics can adopt it just as well as the Census Bureau. We would then have a statement of the amount of cotton ginned in each county, and we might know exactly the condition of the reports by counties as well as by States.

I think it would have a tendency to break up speculation to have it so arranged that these estimates should not all be issued at one time. They could show the condition for one State one day and the condition for another State the next day and the condition for another

State the next day. In that way you would prevent, to a very great extent, the speculative feature in connection with these reports.

You gentleman understand that every safeguard in the world should be thrown around the cotton crop of this country. It brings into the Union about \$600,000,000 every year, and nearly 400,000 is exported. It is due to the cotton crop that the balance of trade is in our favor, and a variation of one-half a cent a pound means a loss or gain of \$25,000,000. Whenever you touch this crop in any figure at all it reaches into enormous numbers.

There is one thing that is somewhat irritating to the producer of cotton, and that is that the Government is bending its every effort to gather all practical information with reference to the production of cotton and is putting it into the hands of the consuming world, but does not give back to us any information relative to the consumptive end of it. We feel, therefore, that the Government is only doing one-half of its duty. We think that we should have just as much information, if it can be gathered, concerning the consumption of cotton as the Government gathers from the productive end of it and gives out to the consuming world. We are working absolutely in the dark nearly all the time. We do not know what the world is taking. We know that our cotton goes upon the market and is sold. We have reports that there are enormous supplies of cotton available for consumption, after it has passed out of our hands; and we ought to have all the information possible that can be obtained by the Department of Commerce and Labor relative to the consumptive end of it, so that this country can, as far as possible, maintain the price of the raw material at as good a price as possible, recognizing at the same time, of course, that the manufacturer is entitled to a fair profit on the investment and the cost of manufacturing.

The CHAIRMAN. How can you foresee the amount of consumption?

Mr. JORDAN. You can not foresee the amount of consumption; but you can foresee consumption just as well as you can foresee production, and a great deal better, because we know the number of spindles. We also know the condition of trade, and it is a great deal easier to find out the capacity of each spindle and to know whether these spindles are in operation all the time, and in that way reach the amount of consumption, than it is to obtain information with reference to the amount of production.

The CHAIRMAN. That will vary every month, as many other of the agricultural products will vary, and it would require an estimate from month to month.

Mr. JORDAN. That is true; but suppose it does vary, I think we are entitled to all the information from the other side that we are asked to give to them.

The CHAIRMAN. If we supply that information to you, would it not be fair to supply it to those interested in all the other agricultural products?

Mr. JORDAN. Unquestionably, if all of the other products are affected.

Mr. BURLISON. Let me call your attention to the fact that we have now a law upon the statute books requiring the Census Bureau to announce on the 1st of September the amount of cotton consumed in the preceding year.

Mr. JORDAN. When is that estimate to be given out?

The CHAIRMAN. At the beginning of the cotton season, the 1st of September.

Mr. BOWIE. That is for the preceding year.

Mr. BURLESON. It is for the purpose of giving the farmer full information as to the exact condition of the cotton stock at the beginning of the cotton season.

Mr. CLAYTON. Mr. Jordan wants that information applied to the current crop.

The CHAIRMAN. Mr. Jordan wants an estimate made on the consumption for the future.

Mr. BOWIE. No; he wants it made along during the month. He wants to know in the month of October what was consumed in September.

The CHAIRMAN. I did not so understand it.

Mr. BOWIE. He wants it just like the ginners' reports, in the month of October.

The CHAIRMAN. I certainly understood you to state that you wanted an estimate of the amount of consumption made from month to month exactly as the estimate of the crop is made from month to month. Did I understand you correctly?

Mr. JORDAN. Of course, if you make your report, for instance, next September as to the amount of consumption for the previous twelve months, if we know there has been no break in consumption, we would naturally assume that we would consume the same amount of cotton for the following twelve months; but you understand that we have had but little or no information along that line. We have been absolutely in the dark.

Mr. LEVER. Your plan is to get the probable consumption for the future?

Mr. JORDAN. Yes; as well as the probable production. We regard that as a very important matter. It is going to be a very difficult matter to get the spinners to tell you what they have on hand.

Mr. SIMS. We are not asking what goods he has on hand, but what the supply is, so that we would have an idea as to how much he would want.

Mr. JORDAN. We could always keep posted very easily, because then you could get a report based upon facts, if you could get every spinner to report the crop on hand of raw material.

Mr. SIMS. Do you know whether or not they would be disinclined to give that information?

Mr. JORDAN. It is required by the present law. That was published by the Census Bureau for the last year, on September 1.

Mr. BURLESON. Mr. North tells me that the manufacturers had no hesitation whatever about giving the data.

Mr. JORDAN. I do not suppose the manufacturers in this country would have any.

Mr. CLAYTON. Can we not gather it abroad from our consular service?

Mr. JORDAN. I believe that it can be done, if there is an effort made to do it.

Mr. CLAYTON. And that is one thing you want done?

Mr. JORDAN. Yes, sir; I think it ought to be done, and I think as you gentlemen think more and more about it you will see the fairness and justice of letting us know something about the consumption, be-

cause we are dealing with a crop here that is a long ways ahead of our other crops.

Mr. BOWIE. Do you think any more statistical information is needed than is furnished by Mr. Hester, as to the weekly mill takings, foreign and domestic?

Mr. JORDAN. Of course he will furnish you with mill takings, but he can not always furnish you with the consumption.

Mr. HAUGEN. You have stated that you think it is important for the Government to get this information for you. Why should the Government pay special attention to the cotton crop of this country and collect this special information regarding it, when the cotton crop is less than one-half the value of the corn crop of this country, is less than the wheat crop, and is much less than the dairy products of this country? The value of cotton is only \$525,000,000, while the corn crop amounts to \$1,215,000,000, hay amounts to \$605,000,000, cattle to \$575,000,000, wheat to \$525,000,000, and the dairy products to \$665,000,000.

Mr. JORDAN. I understand all that; but you must admit that the export of raw cotton is greater than the combined value of the export of all these other products. It runs over a million dollars a day for every day in the year, and it is far greater than the entire export of all other agricultural products combined. If we consumed American cotton within our own borders it would be a different proposition. But you understand that if you do not maintain the price of raw cotton at its true value, when it leaves our shores it is gone forever, so far as we are concerned, and it is to our interest to have it bring back just as many million dollars in gold as it can. I am simply here in the interests of cotton. Of course you should throw every safeguard possible around every crop produced in the United States.

Mr. HAUGEN. I think we export about \$200,000,000 worth of bread-stuffs.

Mr. BOWIE. I do not understand that Mr. Jordan is asking for any discrimination against other crops.

Mr. HAUGEN. I understand that the cotton growers ask that we employ a man in every county to look after this matter. The next step will be to employ a man to guard every cotton field.

Mr. JORDAN. No; I simply ask that the Bureau of Statistics of the Agricultural Department carry this work just as far as the Census Bureau has carried it. They have a man in every county to cover the ginneries in that county.

Mr. HAUGEN. But they do not have that as to wheat and corn. I never heard of such a thing in my part of the country.

Mr. CLAYTON. The same necessity for it does not exist as does in the case of cotton.

Mr. JORDAN. There is no crop on earth that is as much subject to speculation as cotton, and it is the most valuable crop we have, so far as our exports are concerned.

Mr. TAYLOR. There is another matter to be taken into consideration in that connection, and that is that one kind of grain may be substituted for another one, but there is practically nothing that is a substitute for cotton. For instance, if the corn crop is short you can make it up by the use of barley and wheat, and if the wheat crop is short you can make it up with corn and barley.

Mr. HAUGEN. My contention is that if these reports are worth anything and these people are entitled to consideration, then one person is entitled to as much consideration as another, whether he grows Indian corn or wheat or cotton. Why should we discriminate in favor of cotton and leave the others out entirely?

Mr. JORDAN. I am simply discussing the conditions in the Bureau of Statistics as they relate to cotton. Of course if you want this information about wheat and corn you will have to collect it.

Mr. BOWIE. You do not oppose anything which they think is necessary for their protection?

Mr. JORDAN. No, sir; I think everything possible should be done to protect one agricultural product as much as another. But I look upon the cotton crop as a national question.

Mr. HAUGEN. Your position is to have one man in each county look out for that county. Now, if one industry is entitled to the same consideration as another is, you would have to have one for corn and one for wheat and one for cotton, and so on?

Mr. JORDAN. I suppose the same man could do the work.

Mr. HAUGEN. Let me say, in this connection, that the commercial value of cotton is about \$525,000,000 a year, while the Agricultural Department this year estimates the value of farm products at about six billion dollars.

Mr. FIELD. Comparing the plan you propose for gathering this statistical information—that is, by having a paid and accredited agent in each county—with the present system, would it be more expensive to the Government, or not, in your opinion?

Mr. JORDAN. As I understand it, they do not now pay their county correspondents anything at all.

Mr. FIELD. But they pay numerous special agents and traveling agents who work in the Bureau.

Mr. JORDAN. I have no doubt but what these traveling agents are valuable to the Department.

The CHAIRMAN. Have not the estimates given out by the Department of Agriculture in past years been practically accurate?

Mr. JORDAN. Yes, sir; I think so. We have been entirely satisfied.

The CHAIRMAN. If, under the present system, these estimates have been accurate what further is to be desired?

Mr. JORDAN. But the fact is they have not been absolutely accurate.

The CHAIRMAN. Do you think that anybody can guess it absolutely right?

Mr. JORDAN. No, sir.

The CHAIRMAN. You may make a mistake one year and not make it another year. Taking a general average for ten years, the Agricultural Department has been as accurate as it is possible for men to be; is not that so?

Mr. JORDAN. I think so, possibly with one exception.

The CHAIRMAN. My question is what further can we do in the matter?

Mr. CANDLER. I understand your organization favors the continuation of these reports by the Census Bureau and by the Agricultural Department?

Mr. JORDAN. Yes, sir. The Department, as I have stated, could be put upon a basis where it could give us, so far as the Bureau of Statistics is concerned, as nearly accurate information as possible,

and then safeguard those reports, so as not to have them open every month to the criticism of the world.

Mr. BURLESON. I want to state to you, right on that point, that we passed in the House last week a bill making it a penitentiary offense for any official or clerk or employee to give out any information about it. It is now pending in the Senate and we hope this coming week it will pass through the Senate.

Mr. JORDAN. I am glad to hear that. It is unfortunate that you did not pass that law before.

Mr. CANDLER. There is no desire on the part of the producer to have these reports abolished.

Mr. JORDAN. I have not heard from any source that they want these Department reports abolished.

Mr. CANDLER. That is my information. I have had letters from speculators and dealers in cotton to that effect; but not from producers.

Mr. HAUGEN. How is it possible for anyone to estimate the number of bales produced, when an estimate is only furnished as to the percentage, and nothing is furnished as to acreage? I understand the statement here to be that the estimate of acreage is made early in the spring and an estimate is made after that as to the number of acres abandoned.

Mr. BOWIE. I think you misunderstood him.

Mr. HAUGEN. That is the statement made here.

Mr. JORDAN. The idea is to give the abandoned acreage when they make their August report.

Mr. HAUGEN. What I ask is how it is possible to estimate the number of bales when there is no estimate of acreage? For instance, an estimate of the acreage is made in the spring of 100, and in July 25 per cent of that acreage has been abandoned. The percentage of the crop would only be 75, but the estimate furnished by this Department would show that it would be 100 per cent, and you would have no information, so far as the Department is concerned, as to the number of acres abandoned.

Mr. JORDAN. No; but I think before you got into selling, which would begin in August, the Department could issue a report covering the abandoned acreage, because there could be no acreage abandoned after August.

Mr. HAUGEN. You want the information at the time you make your estimate as to the percentage of the crop, and an estimate of the abandoned acreage in the fall would be of no value.

Mr. JORDAN. No; that is true; but it is very hard to get at the abandoned acreage until after the growing season is over.

Mr. HAUGEN. Then what is the value of this report?

Mr. JORDAN. I suppose that during the two months of June and July it would be of value, except as it might be affected by the abandoned acreage thereafter, which would be shown in the August report. If there was no abandoned acreage, the report would then be practically correct.

Mr. HAUGEN. But how would you know?

Mr. SIMS. Mr. Haugen has an idea that there is a large amount of abandoned land, whereas it is always very small.

The CHAIRMAN. Whatever have been the methods employed, Mr. Jordan admits that they have arrived at correct conclusions.

Mr. BOWIE. Reasonably correct conclusions.

Mr. JORDAN. Yes; but you gentlemen should understand that we do not base the price of our cotton on a ten-year average. Each crop of cotton stands on a separate and distinct basis; and we want these Departments to perfect their methods so that we can get an estimate on each crop, and make it just as nearly correct as possible.

The CHAIRMAN. That has been the result.

Mr. JORDAN. No, sir; that has not been done. When you take an average for ten years back you can not do it.

The CHAIRMAN. You want it perfect.

Mr. LIVINGSTON. The estimate for 1904 was two and a half millions out of the way. We practically made fourteen million bales of cotton that year.

Mr. BOWIE. I think you are misinformed about that, Mr. Livingston. I have the official figures of the estimate of the Census Bureau right here before me now.

Mr. LIVINGSTON. I am not talking about the Census Bureau.

Mr. BOWIE. I have it as stated by the Census Bureau, and I have it checked by the official report of the Census Bureau.

Mr. LIVINGSTON. I am not talking about the report of the Census Bureau. I supposed you were talking about the agricultural statistics.

Mr. BOWIE. I have checked this up, and there is nothing like the difference you state.

Mr. LIVINGSTON. What was the Agricultural report?

Mr. BOWIE. The Agricultural report, reduced to pounds, was, in round numbers, six billion one hundred and fifty-seven million.

Mr. LIVINGSTON. That is twelve million five hundred thousand bales.

Mr. BOWIE. I am talking now about pounds. The report of the Census Bureau made it 4,426,000,000, which is a difference of 2,731,000,000 pounds. That can easily be reduced to 500-pound bales, if somebody with mathematical capacity will figure it out.

Mr. LIVINGSTON. The estimate of the Department of Agriculture for the crop of 1904 was 12,250,000 bales, while the Census report was 13,500,000.

Mr. BOWIE. The trouble about that is the Department of Agriculture's estimate of 12,350,000 was made on the basis of 506.2 pounds in a bale, while in the other there was only 478 pounds, and of course it should be reduced to a common basis before you could get a comparison. It is not right to compare a bale of 506.2 pounds with a 478-pound bale.

Mr. LIVINGSTON. Only two or three years before that they missed it a million bales.

Mr. BOWIE. They have never missed it a million bales at any time, when you reduce it to pounds. I have the final Census figures and the figures of the Bureau of Statistics reduced to pounds, and the highest variation at any time for six years was 4.2 per cent. That was in 1904.

Mr. LIVINGSTON. With those two exceptions, the Department of Agriculture has been very close to the crop.

Mr. BOWIE. I think it was pretty close then.

Mr. JORDAN. I have watched the proceedings this morning pretty carefully, and it seems to me that the object of the Bureau of Statis-

tics is to adopt methods that will make the results as nearly correct as they can make them. The suggestions I have made will be, I believe, of great value to the Department if they adopt the plan that is followed by the Census Bureau.

Mr. HAYS. Have you figured how much your scheme would cost for the cotton States, because you will admit that all the cotton States would want to be included?

Mr. JORDAN. It would cost about \$140,000.

Mr. HAYS. And how much for the entire country?

Mr. JORDAN. I am not familiar with the grain sections of the country, and do not know how much time would be required to collect the statistics.

Mr. HAYS. What have you figured?

Mr. JORDAN. I have figured six months in the year with ten days' work a month at \$3 a day, for 800 counties.

Mr. LIVINGSTON. If you take the 800 counties and divide them into 200 districts, and put a paid man and sworn officer of the United States Government to do the work, and have him make the Census reports, as well as the Department of Agriculture reports, you will make a saving of \$142,000 a year on what you now pay.

Mr. JORDAN. I was talking with Secretary Wilson a short time ago about the statistics, and he told me he was handicapped to a great extent by the want of money. I hope Congress will be liberal with the Department.

The CHAIRMAN. All of the Departments of the Government are very much hampered by the want of money, as you will find out if you stay around here very long.

Mr. JORDAN. Of course, I do not know about that. I have not investigated it; but it does seem to me that if we are going to undertake to gather these reports we had better get them correct, and not have them hampered by the need of money. If we can not get them correct, they had better be abolished and not gathered at all.

The CHAIRMAN. Have we not gotten them as nearly correct as it is possible for men to get them?

Mr. JORDAN. That is the question. The heads of the departments admit that it is in an experimental stage.

The CHAIRMAN. It has been going on for fifteen or twenty years to my knowledge.

Mr. JORDAN. They admit they have not got a system that is absolutely correct.

The CHAIRMAN. I do not believe you can improve upon its accuracy.

Mr. JORDAN. It has been shown, during the last six or eight months, that there are a great many features that can be improved upon.

With reference to the Census Bureau, I take it the Census Bureau is going to deal in facts, and that it should adhere strictly to facts. I am partly responsible for the present system of gathering ginning reports by the Census Bureau. I have worked for Mr. North for five or six years. I have had him in my city to address large gatherings of our people, in order to get them interested, so that they would give him information. I have written hundreds of letters to the ginners, begging them to comply with the request of the Department. It seems to me that if you are going to put that Department on an absolute basis of facts, if you have not got a compulsory law, you ought to have one.

Mr. BOWIE. In other words, you do not favor the Census Bureau giving out estimates on the crop at all. You think what they ought to do is to confine themselves to actual enumerations.

Mr. JORDAN. What is our Census Bureau gathering estimates for, if they can not give them out? If they gather them, they ought to give them out.

Mr. BOWIE. If they gather them they ought to give them out; but the question is whether the Census Bureau should not work on actual enumeration and give the facts.

Mr. JORDAN. If that is the law, it ought to be strictly adhered to.

The CHAIRMAN. Mr. Jordan, if it does not interrupt your argument too much, we will now take a recess until 2 o'clock.

Mr. JORDAN. I want to leave here at 4 o'clock.

The CHAIRMAN. We will be glad to hear any further suggestions you have to make after the recess.

Mr. JORDAN. I hope you gentlemen will deal liberally with this Bureau and do everything you can to put it on such a basis as will enable it to get the information we need.

The committee thereupon took a recess until 2 o'clock.

AFTER RECESS.

The committee reassembled at the expiration of the recess.

The CHAIRMAN. Mr. Jordan, we will hear you further, if you have anything more you desire to say to the committee.

Mr. JORDAN. Mr. Chairman and gentlemen, I was asked, when the committee adjourned before recess, to give some expression of opinion with reference to this percentage on the condition of the crops from month to month. I am satisfied that there is hardly one farmer in a hundred who knows exactly what he is doing when he is figuring the percentage on a normal crop. As a matter of fact, I would not know myself just what a normal crop is; and I have been raising cotton for thirty years.

Mr. HAYS. May I ask you a question?

Mr. JORDAN. Yes, sir.

Mr. HAYS. Since the figures, when they have been carefully worked out, state very nearly the facts, is it not a good evidence that the people, on the whole, have about the right idea of what they mean?

Mr. JORDAN. That may be; but I believe you could get more accurate and more satisfactory information to your Department if you would ask for comparative percentages with the preceding crop. Then everybody would know just exactly what they were doing. As a matter of fact, they even now base it largely on the condition of the preceding year; and I believe if you would adopt that plan, which you practically agreed to, while it might change a little bit your methods you would ultimately get better results and it would give you more satisfaction. I think it would give your correspondents more satisfaction if you will put it on that basis, and give them the percentage of condition as compared with the condition of the crop last year. They would then know exactly what they would have to do, because the matter is fresh in their memory.

Mr. HAYS. We do that with some things, such as acreage, and it certainly could be very well experimented with.

Mr. JORDAN. I believe that you could get better results, and of course that is what you want. You want to get as nearly perfect results as possible. I now want to reemphasize our position with reference to these two Departments.

Mr. SCOTT. Before you leave the percentage business, I want to ask what sort of a result you think would be obtained if an arbitrary basis were fixed, without making these estimates? For instance, what would be the result if you would ask your correspondents to state what percentage of the full crop we will get this year, in their judgment, on a normal of one-third of a bale to the acre?

Mr. BOWIE. Or two-fifths of a bale to the acre.

Mr. SCOTT. Yes; or 40 bushels of corn or 30 bushels of wheat.

Mr. JORDAN. That might be some help; but it is rather complicated and the less you complicate it, when you go to the average farmer, the better it is.

The CHAIRMAN. You might say: If you had 20 bushels of wheat last year how much do you think you are going to have this year; or, if you had a bale of cotton to the acre last year how much do you think you are going to have this year. Sometimes he will express it to you in bales and sometimes in pounds.

Mr. JORDAN. It is better for the average farmer if you could express it in pounds or bushels. I believe you would get better results if you do that than if you ask him for percentages, because they are not well up on percentages.

There is one question I want to ask Mr. Hays, and that is what system they use to reduce it to a lint basis. I asked Secretary Wilson that question and he told me the Department had its method, but he could not give it.

Mr. HAYS. An average is often used of three to one, and sometimes an average is used for each State. In getting at the facts for each State we use an average for that State. Some States have a higher average than three to one, and some smaller, as is determined by securing State estimates of averages.

Mr. JORDAN. As a matter of fact, it is running over that now. You will find in a great many States, particularly in my State, that anything like an average year we get more lint out of it than one-third. When I was younger fifteen hundred pounds of seed cotton generally figured out a 500-pound bale. That would depend, of course, upon the character of the seed used, the fertilization, and matters of that sort.

I want to say, before I conclude, that both of these Departments should be maintained, and that I hope Congress will appropriate for them such money as is needed to put them on a good working basis. I also hope they will throw around themselves every safeguard possible, so as not to be put in a position where they can be criticised for being used for speculative purposes. If we were to abandon these Departments I believe the legitimate handlers of cotton would be absolutely at the mercy of speculators.

Mr. LEVER. You want these Departments continued separately as they are now?

Mr. JORDAN. Yes; I want one as a check on the other.

Mr. BOWIE. That is the very point I was trying to get at before adjournment, that the Census Bureau should have its function to

perform and the Bureau of Statistics of the Department of Agriculture should have its function to perform, and they should perform it separately. Then you have one as an absolute check on the other.

Mr. JORDAN. You have a rivalry there, which I think is very desirable. One deals in facts and the other in estimates. The one dealing in facts shows whether the one dealing in estimates is correct, and it is a check on the other bureau. I think for that purpose it is very important that the two should be kept separate and distinct.

Mr. HAYS. Mr. North told me the other day that he wanted to turn the ginning reports over to the Department of Agriculture, and I told him we did not want them.

Mr. JORDAN. Mr. North is entirely too sensitive, particularly when he does something in his Department which he knows is in violation of law.

Mr. BURLESON. Not in violation of law, but not authorized by law.

Mr. JORDAN. That is a distinction without a difference. That was the first time I ever criticised Mr. North in my life. I am always trying to assist him in every way that I can.

Mr. BURLESON. I would like to ask you this question: In the past summer, before the Bureau of Statistics perfected its methods of estimating cotton, were not estimates issued by professional estimators and were they not always overestimates?

Mr. JORDAN. Some of them were, particularly the ones made by those who represented foreign interests. They had no check upon them. The method of selling cotton in the South, as you gentlemen know, under the old system was to market the crop as rapidly as possible, and to sell a twelve-months' supply in about four months. Now, if it is left to professionals and people having selfish interests at stake to get out these reports, they will dominate and harass the market for three or four months during the fall season, and then they have served their own interest.

If the Government comes in, it certainly should occupy a position of absolute impartiality between the producer and the consumer, and the Departments should make their estimates as nearly as can possibly be done on facts. Then you have a check upon the estimator and they can not take advantage of the people. Clearly that is what our Government is for. It is to protect the people, not only the producers and the consumers, but everybody who is engaged in any legitimate business. That is what our people want. We do not want to place these spinners in a position where they can be taken advantage of by speculators, and we do not want the spinner to be put in a position where he can take advantage of the producer. The nearer we can come to getting the truth and giving it to the world on a basis of facts, and at the same time protect as far as we can and restrict within as narrow limits as we can speculation, the better it is for all.

Mr. BOWIE. So that the net result of your position is that we ought to make such improvement, from time to time, in the system as experience demonstrates to be wise; but that the system itself must be maintained, if we want to protect people against the manipulation of speculators.

Mr. JORDAN. Unquestionably. The very minute you abolish these Departments you put the producer in the hands of the speculators.

Mr. BOWIE. The suggestion has been made in some quarter that the estimate of the Department of Agriculture of crops issued about the

1st of December, based on reports as of the 20th of November, should be moved up until after the 1st of January. In your judgment, should that estimate be delayed until January, and if delayed until January, would it be of any particular service?

Mr. JORDAN. I do not think it should be delayed.

Mr. BOWIE. Is it not a fact that the longer you put it off the less cotton there is in the hands of the producer to be benefited by the reports to be made?

Mr. JORDAN. That has been true in the past; but I hope it will be wrong in the future. We are trying to educate our people to move the crop so slowly that we can regulate the supply so as to meet the legitimate demand.

Mr. BOWIE. But still, even under that system, they would sell some cotton in December.

Mr. JORDAN. Unquestionably.

Mr. BOWIE. The later you make your estimate the less valuable it is to the producer and the less valuable it is to the consumer, who wants to arrive at the facts so as to base values upon it.

Mr. JORDAN. Yes; that is true. I do not see any reason in the world for advancing into January the giving out of these estimates of crops.

Mr. FIELD. What is your experience as a farmer? Have you realized better results by marketing your cotton as it is ready for market or by holding it to wait for better prices? In other words, what do you think of this advice that is being given to the farmer, to hold his crop for higher prices and very much higher prices?

Mr. JORDAN. I can answer from personal experience. I always hold my cotton until after the rush is over.

Mr. FIELD. When is the rush over?

Mr. JORDAN. It is usually about April or May. I have not sold a pound of cotton since 1899 for less than 10 cents a pound; and I would not produce it for less than that. It is not a question of high price or low price. It is a question of what is the intrinsic value of the staple.

Mr. FIELD. How is the farmer to estimate what will be the value of his cotton three months or five months or six months in advance of the time when his crop is ready for market?

Mr. JORDAN. It is bad policy to follow any system that will throw an enormous oversupply of any product on the market within a very short period of time, because you then put the whole price of that commodity in the hands of the speculators. It is not regulated by the legitimate laws of supply and demand. What we want to do is to regulate the sale of cotton by the legitimate laws of supply and demand.

Mr. FIELD. Is it not the province of the speculator to stand between the producer and the consumer, and when the price of cotton is low does not the middleman hold it for better prices?

Mr. JORDAN. That is true in a great many instances.

Mr. FIELD. Do you think that any good result will follow this general advice that is being given to the farmer to hold cotton worth, we will say, 10 cents on the local market at this time, for a price of 15 cents?

Mr. JORDAN. I do. I am holding my own cotton for it.

The CHAIRMAN. How many cotton producers are there in the South?

Mr. JORDAN. In the neighborhood of three million.

The CHAIRMAN. Do you think you can teach these three million producers to sell their cotton just as the market will take it, at a certain price?

Mr. JORDAN. Yes, sir; I do.

The CHAIRMAN. How can you do it?

Mr. JORDAN. All you have to do is to provide proper facilities.

The CHAIRMAN. To what facilities do you refer?

Mr. JORDAN. To warehouse facilities.

The CHAIRMAN. They have never succeeded in doing that in the wheat section?

Mr. JORDAN. But before they had these elevators nearly all the farms in the West were under mortgage. When they established elevators and brought down the supply to meet the demand they were able to maintain prices and to market their product at reasonable prices.

Mr. HAYS. Will you please give the price of cotton during the year? How much higher has it been in the summer?

Mr. JORDAN. I have not got the figures; but I know there has not been a year in the last five or six years when cotton could not have been sold at 10 cents a pound, because I have sold my own cotton every year for that.

Mr. FIELD. Is it censurable for the consumers of cotton to agree among themselves that they will not pay more than a certain price for cotton?

Mr. JORDAN. You mean among cotton growers?

Mr. FIELD. Among cotton spinners and mill men.

The CHAIRMAN. He is taking the other side of the question now.

Mr. FIELD. Is it right or wrong?

Mr. JORDAN. I suppose they can pass such resolutions among themselves as they please; but we have got the cotton in our possession and have the say whether they shall have it or not.

Mr. FIELD. I am not talking about resolutions. I am speaking of actions, by which they agree among themselves not to pay more than a certain price for cotton.

Mr. JORDAN. I have no doubt but what they do it. I do not think there is any question about that. They are fully organized and have been for fifty years.

Mr. FIELD. Then you think that the organization of the farmers with a view of holding their cotton for a certain price has grown out of that necessity?

Mr. JORDAN. Yes; very largely, and also out of the fact that they are better educated than they used to be. They have now the free rural-delivery system, the telephone system, and better schools and roads; and it is making the man in the country very largely as cosmopolitan as the man who walks the streets of a city. He is gradually beginning to grasp the idea that the South controls a monopoly of what the entire civilized world depends upon for clothing, and that he has not had a square deal in the past. Hereafter he will begin to market his crop in an intelligent manner, at a price which will be fair to the consuming world and pay him a profit on his production. I have raised cotton for years and years, at an absolute loss.

The CHAIRMAN. I have raised cattle for years and years at an absolute loss.

Mr. JORDAN. Then I would not blame you for trying to market them at a profit.

The CHAIRMAN. If people will not eat the beef, what shall I do with them?

Mr. JORDAN. You have not got a monopoly on cattle raising, but we have got a monopoly on cotton production, and we are beginning to know it.

Mr. HAUGEN. Do I understand you to say that the producers of grain in the West have elevators and they in that way control the market?

Mr. JORDAN. No; I said that these elevators had been a material benefit to them.

Mr. HAUGEN. How many farmers in the West own them; do you know?

Mr. JORDAN. I do not know that they own them; but I understand they can put their wheat in the elevators and issue a receipt against it, and use that receipt for the purpose of borrowing money.

Mr. HAUGEN. The storage charges and insurance, in a few months, would use up the whole profit. They pay at least a cent a bushel per month for storage, and in nine months it will amount to 9 cents a bushel.

Mr. JORDAN. I know that when we establish our warehouses in the South, and make warehouse receipts issued against cotton as negotiable as any paper in any financial center in this country, we will be able to manage our cotton crop so as to force the consuming world to pay us what it is worth.

The CHAIRMAN. That is a matter which pertains to yourselves and not to the Government.

Mr. JORDAN. It is a matter which pertains to us, and it is a matter we are going to work out. We are making splendid progress along that line now, and it is very gratifying.

I will ask you gentlemen to-day, in behalf of the people of the South who are engaged in the production of this great crop, to maintain both of these Departments, and to be liberal in your appropriations to them, because agriculture is the basis of our wealth, and you should assist these Departments in improving their methods so as to give to the producer and the spinner just what information they need, in order that business may be conducted with fairness and equity.

Mr. HAUGEN. How about the third Bureau? I understand the Weather Bureau also makes crop reports.

Mr. JORDAN. That is part and parcel of the Agricultural Department.

Mr. HAUGEN. But how about the third Bureau?

Mr. JORDAN. We think the Weather Bureau is very valuable. As long as I lived on my plantation there was nothing that I looked forward to with more interest every day than the Bureau reports about the weather.

Mr. HAUGEN. I am not speaking about the weather. I am speaking about crop reports.

Mr. JORDAN. I think they need some revision in that line, because there have been pretty wide discrepancies between the reports of the Bureau of Statistics and the Weather Bureau reports.

Mr. BOWIE. What do you think of the suggestion that the Chief of the Weather Bureau should meet with the Chief of the Statistical Bureau, and that they should coordinate their reports.

Mr. JORDAN. It is a very proper thing to do.

Mr. HAUGEN. Do you think the Weather Bureau should report on crops?

Mr. JORDAN. I did not know that the Weather Bureau had been reporting crops. We have not looked to the Weather Bureau for our information as to crops. We looked to the Bureau of Statistics and the Census Bureau.

Mr. HAUGEN. You never looked to the reports of the Weather Bureau?

Mr. JORDAN. We looked to them; but it is not regarded as a matter of any great importance, and it does not have any effect upon the price.

Mr. HAUGEN. Is it not a fact that if you had only one bureau it would be looked upon as of some importance, while the fact that you have three or four of them leads to the belief that none of them are important?

Mr. JORDAN. If both covered the same class of information, I would admit that you were correct; but one is gathering estimates and the other facts.

Mr. HAUGEN. And I understand that the third one also deals in estimates.

Mr. JORDAN. I think the Weather Bureau is there for the purpose of looking after the weather and not for the purpose of reporting crops.

Mr. HAUGEN. I supposed so; but I understand they are engaged in this business.

Mr. JORDAN. I am not interested in that.

Mr. HAUGEN. And that more people are employed in gathering statistics and reports on crops than there are in gathering reports on the weather.

Mr. JORDAN. I would be perfectly satisfied if the Weather Bureau left that work to the Department of Statistics, and confined themselves to getting up reports on the weather. However, I suppose that if they should cooperate with the Department of Statistics it would not do any harm, because they could furnish the Department with a great deal of information.

Mr. HAUGEN. I think some one stated here to-day that the information was not made use of.

Mr. BOWIE. I think it is intended that it shall be made use of.

Mr. HAYS. It is not now made use of, but the Chief of the Weather Bureau turns over to the Bureau of Statistics any information we may need, and is glad to cooperate with us in every way.

Mr. JORDAN. There is another matter I would also suggest. Of course all of these things are mere suggestions which I present to the committee. My suggestion is that instead of gathering all this information at one minute, and giving it out over the wires, and possibly driving cotton up or down a hundred points, it should be given out one State at a time.

The CHAIRMAN. What advantage would you gain by that?

Mr. JORDAN. The advantage there would be that you would get rid of the speculative feature.

Mr. HAYS. That would result in the estimate for the crop being given out by the speculator instead of by the Government.

Mr. JORDAN. You could give it out in ten days instead of giving it out in one minute.

Mr. HAYS. If we give it out from day to day, would there not be a period when the speculator could bunch this information together and gain credence for having done it pretty well?

Mr. JORDAN. Possibly that might be so, but I would make it just as hard for him as possible.

Mr. BOWIE. That plan was tried by the Census Bureau and was abandoned, because it was found one day it would shoot up and another day it would shoot down, and the estimates for one State and another were so different that, practically, they were suspending legitimate business. You know they have got to sell the actual cotton.

Mr. JORDAN. Was it not true that the fluctuations were caused by the exchanges and not by the people at large?

Mr. BOWIE. I do not know.

Mr. JORDAN. I expect you will find that to be the case.

Mr. HAYS. Is it not necessary in making a statement that the general public will understand, to do so by weighting and making the percentages of each State apply to the acreage in that State?

Mr. JORDAN. You are obliged to do it in that way.

Mr. HAYS. Then the people who are interested in the dealings would do it, as it seems to me.

Mr. JORDAN. They do it any way.

Mr. HAYS. But we would be furnishing them the information.

Mr. JORDAN. You want to give the information to them, but not all in one minute.

The CHAIRMAN. Mr. MacColl, president of the New England Cotton Manufacturers' Association, is present, and we would like to hear any suggestions he may have to make.

STATEMENT OF JAMES B. MACCOLL, PRESIDENT OF THE NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION.

Mr. MACCOLL. Mr. Chairman and gentlemen, there is some difference of opinion among cotton manufacturers with reference to the changes that should be brought about in the Government crop reports, but I think there is a unanimity of opinion that they should be mainly confined to accurate statistics, and that the speculative element should be removed from them as much as possible.

With regard to the suggestion of converting the percentage figures of condition into actual bales each month, I wish to point out that this would practically mean that there would be seven crop estimates during the season. Beginning with June they would continue until September, so that instead of one we would have seven crop estimates. In my opinion nothing would be more disastrous than that course, to all the interests involved. In the first place it would be very difficult for the Bureau of Statistics to have these crop estimates in bales constant. As proof of that I would simply point out that in 1903 September jumped nearly 2,000,000 bales in one month, and then dropped down 1,700,000 bales the next month. You can readily see

the tremendous effect that would have upon the market. In the next year, beginning with a crop of 11,300,000 bales, it went up to a crop of 13,300,000 bales. It jumped 800,000 bales in one month, 900,000 bales in another month, and this last year, between September and October, there was a difference of about 900,000 bales, or about 10 per cent.

I think that what we want to avoid in order to reduce speculation is the definiteness of figures: It has been well pointed out in the Keep Commission report, that these figures are not mathematical computations, but are simply descriptive terms, and we should use descriptive terms, in my opinion. I do not say that this opinion is final or that some better way may not be worked out, but it seems to me we should avoid mathematical expressions and use descriptive words that would be intelligible to anybody. To any man of average common sense such words as "excellent," "good," "fair," "poor," and "bad" are intelligible. I do not think there is anyone here who could look at a field of cotton, and had any experience with cotton, who would not use one of those words intelligently with regard to it. Take the number of acres as to which the word "excellent" is used, the number of acres as to which the word "good" is used, and the number of acres as to which the word "bad" is used, and there would be a sufficiently accurate knowledge conveyed to us of the general condition of the cotton crop during the growing season; and it would be so indefinite that speculators could not work their game to the same extent they do now. You know that if these percentage figures are used and it is understood that the percentage figures are a few pounds out, the market must at once drop, and there is a bearish market. On the other hand, if the figures are realized an opposite result is obtained.

I think it would be very disastrous to the manufacturers, to the cotton consumers, and to the Bureau of Statistics to put these figures into exact bales, because they are converting what is not a mathematical matter into a mathematical matter.

There are one or two other practical suggestions I would like to make, and one is with regard to the acreage of cotton. It seems to me it is not for us to suggest which of the Departments of the Government can make the best returns with regard to acreage, but it is a very important and vital matter that the acreage should be correctly estimated. It is for the gentlemen of this committee and the Departments of the Government to decide whether the Census Bureau or the Bureau of Statistics of the Department of Agriculture can give us the most accurate statistics on acreage.

With regard to the weight of bales, I think there should be one uniform weight for a bale used for the cotton industry throughout the world. We have had running bales, and gross weight bales of 500 pounds, and net weight bales of 500 pounds. These figures have tended very much to increase speculation, because the average man does not go to the bottom of the subject. The figures are so uncertain that it is very difficult to grasp it. For example, the National Ginners' Association this year published an estimate of cotton ginned in net 500-pound bales. They understood the Agricultural Department to say they would publish theirs in net bales. But on the contrary the Agricultural Department published theirs in 500-pound gross

bales, equal to 478 pounds net. Then we have the Census Bureau converting this into 500-pound gross bales.

I should like very much to see uniformity of method and expression used, making 500-pound gross bales the uniform standard. We might state "running bales," but we should at the same time convert it in all reports into 500-pound gross bales, and once and forever get rid of this complicated manner of quoting the number of bales in any report.

I think there could be a great deal accomplished to reduce speculation by bringing the different reports of the Census Bureau and the Agricultural Bureau out at a uniform time of publication. There are several reports which could be issued in that way, and I think nothing would have a better effect. For example, on September 3 we had the condition report and on September 8 the ginners' report. You can readily see that if the condition report was delayed until September 8 you would have two reports coming out at the same time, which might conflict to some extent, and the speculator could not determine, in a minute, by a mere statement of percentages, the condition. He could at once step in and do his work and depress the market. He would have to stop and weigh the efficiency of both these reports, and one would have a great effect upon the other. It would take some days to fully digest the meaning of these two reports, and it would have a wonderfully steadying effect upon the market. But instead of that we have one on the 3d which may depress the market, and on the 8th a report may come out which conflicts with the one of the 3d and up goes the market again.

And so, on October 3 we have a condition report, and on October 8 a ginners' report; on November 3 a condition report, and on November 8 a ginners' report; on December 3 a condition report, and on December 8 a ginners' report.

It would be a splendid point if they could bring these two reports out together for the month, and in that way reduce the number of reports. It would also have a marked influence in restraining speculation.

It is true that the estimates and statistics for a period of years have been found to be very accurate; but when carefully compared by States they are found to be very inaccurate, and that is where the opportunity of the speculator comes in. He at once goes to work to point out the discrepancies in the different States. In proof of this take the year 1899, when the reports of the Bureau of Statistics and the Bureau of the Census were only about 4 per cent apart.

But in the State of Florida the Bureau of Statistics estimated only 54 per cent of what the Bureau of the Census did. In the State of Tennessee it estimated 126 per cent as compared with 100 per cent by the Bureau of the Census. In other years there are equally varying discrepancies. That is where the opportunity of the speculator comes in. He at once picks the report to pieces, and points out these discrepancies. I believe that if words were employed which are very generally applied to crops it would be a great improvement. I think that if you or I went out to look at any crop we would not think of asking whether it was 72 per cent or 80 per cent, but we would say, "That is an excellent crop," or we would say, "That is a poor looking crop," or we would say, "That is a bad crop." Those are the

words that every common-sense man uses with regard to crops, and that is all we need to know.

I think it would be one of the most disastrous changes that could be made for the Government to give us seven crop estimates each year, which are at best merely guesses.

Mr. BOWIE. I understand you do not approve of the report of the Keep Commission in that particular?

Mr. MACCOLL. In that respect I think it is a very fatal mistake.

Mr. SIMS. Then I understand you want the reports of the Government to be issued in such language that they will convey the least possible information to those who desire that information, so that the speculator and no one else will know what to do?

Mr. MACCOLL. I am speaking of condition reports. When we come to reports of statistical facts we want absolute accuracy; but when we are getting something that is a mere estimate it is a mistake to put down what is descriptive in mathematical language.

Mr. HAYS. You would leave it to the speculators to compute these things into figures?

Mr. MACCOLL. They would never agree about it in getting down to definite figures.

Mr. HAYS. They would have to agree on figures to get at the daily price?

Mr. MACCOLL. They would all form different conclusions as to the exact meaning of those terms. I may say that this idea is also approved by the American Manufacturers' Association, which represents largely the manufacturers of the South. After very careful consideration they approve of this as the soundest method of giving out condition reports. It does not, of course, apply to reports of actual facts. I believe in having those as accurate as you can get them.

Mr. SCOTT. You would not have the Bureau of Statistics give estimates of the number of bales at all?

Mr. MACCOLL. No, sir; because it is a mere guess.

Mr. HAYS. Let me ask you if you are using the terms "actual facts" and "estimates" just right? If you have a statement of facts from these agents as to conditions, is not that a fact?

Mr. MACCOLL. I used the expression in general words.

Mr. HAYS. In how many words?

Mr. MACCOLL. Five.

Mr. HAYS. If you used a range of five words, your words would eventually become figures, if you make it so that it means anything. We have not seen how we could use these words, and so far as we have put it to the test it has not worked out well.

Mr. MACCOLL. I have just pointed out how badly the other plan works.

Mr. HAYS. The idea of this plan is to give a statement of what the crop is going to be, and that is a fact as to the condition at that time. It is not an estimate; it is a fact as to the condition, and anybody who wants to can make the estimate.

Mr. MACCOLL. It states it very definitely and mathematically when it is not a mathematical matter.

Mr. HAYS. It is just a method of expression, and whether you express it in one way or another amounts to the same thing.

Mr. MACCOLL. It is all based on a percentage of 100, and that is

a very difficult thing for different minds to understand in exactly the same light.

Mr. HAYS. You are now attacking the plan of using the words "normal" and "one hundred per cent." You have not heretofore objected to that. If you object to that, it takes us into a different matter.

Mr. MACCOLL. I object to the method of estimating the crops definitely by a percentage. I do not think that is proper. These figures show the impracticability of it. And here is where the speculators come in. You give these figures as definite facts, which definite facts the speculator gets to work on at once. This is an average for ten years, and he will pick out the last three years and prove that your figures are entirely wrong; that the same figures, based on the average for the last three years, will figure out ten or eleven million bales.

Mr. SIMS. I would like to have you define what you mean by the term "speculator."

Mr. MACCOLL. I think it is very well understood that there are a large number of people engaged in speculating in cotton—raising and depressing the price—with the object of making money.

Mr. SIMS. Professional operators?

Mr. MACCOLL. Yes, sir.

Mr. SIMS. I want to ask you if spinners do not buy and sell futures.

Mr. MACCOLL. Yes; they do to some extent.

Mr. SIMS. And to that extent are they not speculators, to all intents and purposes?

Mr. MACCOLL. I think they are speculators, in one sense of the word, if they do that at all. But everybody is speculating in business to some extent.

Mr. SIMS. Then, the spinner wants the future market all to himself, and he does not want the professional operator. He wants to exclude the professional operator.

Mr. MACCOLL. My opinion is that the spinners of this country have used the future market to a very small extent. Lately they have been forced to use it more, but they have not used it to any large extent in years gone by. There are thousands and thousands of manufacturers who have never bought a bale of futures.

Mr. SIMS. Is it not a fact that the speculators are divided into bulls and bears, and that the effect of their operations is nil?

Mr. MACCOLL. If there is no evil about it it is not worth while for us to waste time about it. We think it has been a tremendous evil in the last three or four years.

Mr. BURLESON. You insist upon the necessity of uniformity of statistical expression, and that we should not have a gross-weight bale, a net bale, and a running bale?

Mr. MACCOLL. Yes, sir.

Mr. BURLESON. You understand that the Census Bureau in its final report and the Agricultural Department in its December estimate have agreed upon a uniform and specific expression?

Mr. MACCOLL. Yes, sir.

Mr. BURLESON. So that objection is eliminated.

Mr. MACCOLL. Yes; except that the Census Bureau in the reports published earlier than the January report might also convert the bales into the statistical standard of 500 pounds gross.

Mr. BURLESON. They would if they could, but they have not the information upon which to do it, and Mr. North will so inform you if you will communicate with him by letter. You now say that a multiplicity of reports should be avoided; that is, where the Bureau of Statistics issues a condition report upon the 3d and the Census Bureau issues a report on the 8th, that if possible they should be issued on the same day. I agree with you about that. I do not think any cotton producer would object to that. You agree to the necessity of issuing condition reports during the cotton season. You say that is important, and that it should be done, in order that the manufacturer and producer may know the condition of the crop; but you object to the method of announcing this condition. Instead of announcing it in a percentage you would announce it in some word that would indicate the character of the crop.

Mr. MACCOLL. Yes, sir.

Mr. BURLESON. That is merely a matter of judgment as to the best way.

Mr. MACCOLL. Yes, sir; that is true.

Mr. BURLESON. Now, we come down to a point of difference. You say you do not believe there should be an estimate upon the 1st of December by the Bureau of Statistics as to the number of bales of cotton that is to be grown during the current season?

Mr. MACCOLL. I have not said that; but I object to increasing it to seven estimates a season.

Mr. BURLESON. I agree with you about that, and I suppose every producer will agree with you in it.

Mr. MACCOLL. There will be seven estimates if you convert the percentage into bales.

Mr. BURLESON. And therefore I agree with you that the recommendation of the Keep Commission is very bad. But I want to know if you do not believe that there should be an estimate made of the cotton crop between the 15th of November and the 1st of December.

Mr. MACCOLL. I would suggest that it should come out on the same day as the ginners' reports.

Mr. BURLESON. If it could be made to conform to the date of issue of the ginners' report and come out at the same time, would you object to it?

Mr. MACCOLL. That would be a great deal better.

Mr. BURLESON. You think there is a necessity for an impartial estimate of the cotton crop to be issued about that time?

Mr. MACCOLL. I do not object to that estimate if it comes out in conjunction with the ginners' report.

Mr. BURLESON. I think we are about of one mind in regard to this matter.

Mr. MACCOLL. May I ask you how you think the percentage report should come out?

Mr. BURLESON. I do not believe the terms "good," "excellent," and "bad" are flexible enough. I do not believe you can express the condition of the crop as accurately by using those terms as you can by using a percentage. Furthermore, the Agricultural Department has been using this method of statistical expression, and if you now abandon it you lose the principal advantage of the statistics gathered in years gone by; for the purposes of comparison. You will admit that?

Mr. MACCOLL. Yes.

Mr. BURLESON. If you adopt a new system of this kind all that has gone before is lost.

Mr. MACCOLL. You believe in continuing the present practice?

Mr. BURLESON. I believe in continuing it, because I believe it is the best system we can devise. As a matter of fact, does not the estimate issued by the Bureau of Statistics in the Agricultural Department come nearer to announcing the real cotton crop than the estimate from any other source?

Mr. MACCOLL. I think it does.

Mr. BURLESON. If that is true, why should we come in and meddle with it and attempt a reconstruction or modification of a plan that has resulted so satisfactorily?

Mr. MACCOLL. I admit that it has been very accurate in its totals; but it has been very inaccurate as to States.

Mr. BURLESON. You will admit that all estimates must be measurably inaccurate? If they were accurate they would not be estimates, would they?

Mr. MACCOLL. No, sir.

Mr. BURLESON. I believe you want just what I want, and that is the honest truth with reference to the cotton crop, as near as it can be had, to be issued along about the 1st of December, or between the 15th of November and the 1st of December. Admitting, as you have, that the Agricultural Department estimate is the most accurate one that has been issued for a number of years, why, unless you have some way of pointing out a plan by which it could be improved, do you think that we should restrict, disturb, and modify it; is there any reason?

Mr. MACCOLL. You are simply confining your remarks now to the final reports?

Mr. BURLESON. I agree with you largely in every suggestion you have made.

Mr. MACCOLL. I was very much alarmed by the statement of the Keep Commission that these percentage figures should be converted into a definite number of bales.

Mr. BURLESON. I did not understand Mr. Jordan to say that we would have seven estimates per year.

Mr. JORDAN. I did not refer to it at all.

Mr. BURLESON. The only reference to it was by Mr. Olmstead.

Mr. MACCOLL. I understand Mr. Hays to favor that. I understood him to say he thought it would be a good thing to convert it into bales.

Mr. HAYS. I am not sure that we are ready to do it yet, but I said I thought it would be a good thing when it can be done. I was not talking about cotton alone, but all along the line. Wherever we can express these facts in figures, so that all people will understand them, rather than in percentages or some general expression that only experts will understand, I am in favor of doing it. I am not in favor of doing it where it is impracticable, and I think it is impracticable in regard to cotton; but I believe it can be gotten at some time so that it can be done.

Mr. BURLESON. I make my living by producing cotton, and I agree that the cotton producer can not prosper unless the cotton manufac-

turer prospers. You agree that the cotton manufacturer can not prosper unless we make cotton for him to manufacture. Now, our position is identical. Do you not agree with me that the Government ought to make this estimate, and make it as nearly accurate as it is possible to make it?

Mr. MACCOLL. That is what we want, sir.

Mr. SCOTT. I want to ask one question, because of an answer which Mr. MacColl has just made to Mr. Burleson which leads me to think he must have misunderstood a question I asked him or that I misunderstood his answer. I asked him a moment ago whether he believed that the Government should publish any estimate, in bales, of the cotton crop, and I understood his answer to be in the negative. Yet when Mr. Burleson asked him the question I understood him to say that he agreed with him that the publication of one estimate on or about the 1st of December would not be objectionable.

Mr. MACCOLL. I think the difference probably refers to the number of estimates. I was talking about the proposition to change to definite bales in the condition reports, which would mean seven estimates a year, and it seemed to me that would be a very great mistake.

Mr. SCOTT. You wish now to be understood as saying that you have no objection to one estimate?

Mr. MACCOLL. I think one estimate in December, published on the same day as the ginner's reports come out, would be very satisfactory.

Mr. ADAMS. Objection is made here to the publication of the estimates in bales, so far as cotton is concerned, in condition reports. I am utterly unable to understand the objection for this reason, that the cotton speculators, like all other speculators in the United States, are tolerably smart fellows and understand arithmetic ordinarily well. There is not one in 10,000 of them but what can figure that out in fifteen minutes, and know just as much by the publication of the percentages as they would know by a statement of the number of bales.

Mr. SIMS. You must remember that your percentage conditions are always highest at the beginning of the season, because the opportunities for deterioration have not yet come. Now, suppose the first report is made on an average of 96 and there are 30,000,000 acres. The Government comes out with an estimate of a crop at 15,000,000 bales of cotton.

Then each report that comes out would show less and less cotton, and the final report might show a very small crop; but the impression made by this report, published by Government authority, would be such that the market would never recover from it. Furthermore, it is true that smart men do make estimates and percentages and give them out, but the world does not credit the results like they do Government estimates.

Mr. ADAMS. I believe that every one of these boards of trade do credit them. I am not here to state that these percentages ought not to be published, but I say that if you are going to publish them you may just exactly as well figure them out yourself.

Mr. SIMS. The boards of trade and the members of the exchanges may perhaps get to gambling with each other upon the basis expressed by the percentage, but we lambs would stay out and would not take the risk of going in.

Mr. ADAMS. Then the only possible protection in the world for the lamb is utter and complete ignorance?

Mr. HAYS. Mr. Chairman, this whole discussion is an argument that we ought to put it down in bales, because you gentlemen do not understand that matter of the descending scale. When you do understand it you will see at once that if we can get any formula to put it in bales it should be put in bales.

The CHAIRMAN. I understand there is no objection to that. Mr. MacColl says he has no objection to it being published in bales in December.

Mr. MACCOLL. But Mr. Hays is now going back and arguing in favor of having it published every month in bales.

Mr. HAYS. I am not arguing for that. I have stated, in a general way, that whenever any of these estimates can be put in figures they should properly be put in figures; but I am not sure that the formula will apply well enough and I am not sure our basis is yet sufficient.

But I am inclined to think that as soon as we get a few more ginners' reports we can put that in efficient form. Mr. Sims does not understand what the speculator does with that 90 per cent. It does not mean 15,000,000 bales. You have assumed that it meant 15,000,000 bales. That would be corrected by putting it down at 10,000,000 bales, if that was what the formula worked out.

Mr. BOWIE. I think the objection of Mr. MacColl is that the very minute you do that you have practically made six or seven estimates in one year.

Mr. HAYS. You do it now, under the present system.

Mr. BOWIE. So long as it is put on a percentage basis nobody figures it as being anything more than the condition of the crop. But the very minute you put it on a quarantine basis everybody will say you have made seven estimates in the year. The condition report is now understood to be merely the present condition of the crop, without any prognostication. But the very minute the quantitative form is used it is going to be understood as being a prognostication instead of a condition. There is no power in the world, in my judgment, that can prevent it; and for that reason I thoroughly agree with Mr. MacColl. I also agree with the suggestion that the condition report and the ginners' report should, if possible, be sent out on the same day. But I think that if Mr. MacColl will consider this question fairly he will see that the five terms which he suggests, good, excellent, bad, poor, etc., are not sufficiently flexible, and to that extent I think perhaps he would revise his opinion after giving it further consideration. My opinion is the reverse of his in that respect, but I agree with him on the other two points made.

Mr. MACCOLL. I would just like to make one of these points a little more clear. Mr. Adams has suggested that anyone could figure up the actual bales by knowing the percentage. It is true, to some extent; but, on the other hand, there are a great many different ways of interpreting the percentages, and that saves the market. If it could be brought down to a mathematical basis, it would increase the speculation materially.

Mr. BOWIE. Is it not also true that now, under the percentage form, it is understood to relate purely to the present condition, but the very minute it is put into the quantitative form it would be a prognostication.

Mr. HAUGEN. At present we are furnishing information so that it can be understood by experts, and those who are not experts are kept in ignorance as to the actual condition of the crop.

Mr. MACCOLL. I do not think it is understood by experts any better than it is by others. It is understood by everybody as an estimated condition, but it can not be put into mathematical numbers.

Mr. HAUGEN. In order to ascertain what the crop is, you have to figure the percentage and estimate the number of bales.

Mr. MACCOLL. I have just shown you that if you do that you will be misled, because I have shown you that the crop jumps up two millions one month and down two millions the next month.

Mr. HAUGEN. What terms are used in the cotton exchanges? Do they use the terms good, bad, poor, etc., or is it expressed by percentages? If I should ask you what was the condition of the cotton crop would you say it was 78 per cent?

Mr. MACCOLL. I think I would describe it by words. I have never heard percentages used. If I were asked how the cotton crop was this year, I would describe it in words.

Mr. HAUGEN. I believe it is customary with the cotton growers to use percentages.

Mr. MACCOLL. If I asked you how the cotton crop was this year, would you give it to me in a percentage or would you say it was very poor indeed or about medium?

Mr. JORDAN. I might, in the course of conversation, if I wanted to get right down to a basis of facts, use the percentage; because you might have to use 50 different terms in a fluctuation of 50 points. There are hardly any two farmers who would agree about "good," "fair," "indifferent," and "bad."

Mr. HAUGEN. I was asking about what terms are used, generally, by cotton growers.

Mr. JORDAN. As a general expression, as a matter of course, I use the terms "good," "fair," etc.

Mr. HAUGEN. If those are the terms used generally in cotton exchanges and by cotton growers, why would they not be proper terms to be used by those who furnish this information?

Mr. JORDAN. I do not think those terms are used in the cotton exchanges.

Mr. MACCOLL. They do not deal with percentages in speaking of crops during the season, except with reference to the statistics of the Bureau of Statistics.

The CHAIRMAN. What have you to say to Mr. Jordan's statement that the manufacturers have been organized for fifty years to keep down the price of cotton?

Mr. JORDAN. I did not say that. I said they had been organized for fifty years.

The CHAIRMAN. For what purpose? You propose to organize the farmers and feed out this cotton at a profitable price; and you said in that connection that the manufacturers had been organized for fifty years. It is presumable that they were organized to prevent the farmers from getting a proper price.

Mr. JORDAN. The manufacturers do not deal with the farmers at all. I only meant that they had been organized for fifty years, and I thought it was time for the farmers to organize.

The CHAIRMAN. Your idea was to organize the farmers and have them feed out the cotton to the manufacturers at a high price?

Mr. MACCOLL. I would like very much to ask Mr. Burleson one question in regard to the impossibility of the Census Bureau giving the statistics in bales of 500 pounds gross. I notice in the report of the ginnerers they give the number of bales ginned and the average weight of bales ginned.

Mr. BURLESON. The Census Bureau now announces the result in running bales during the cotton season, and when the final report is issued it is averaged into 500-pound gross weight bales. Mr. North tells me it is impossible for him to convert the ginnerers' reports as they reach him each month into 500-pound gross-weight bales, because he has not got the data. The weights are not sent in and he does not know what the average weight per State or county will be until the end of the season, when he gets that data in hand.

Mr. MACCOLL. I have seen the ginnerers' card, and they do contain the average weight of bales. Mr. Taylor was able to issue a statement in net 500-pound bales. It seems to me if we could get a uniform method of expression it would be a tremendous advantage in the cotton business.

Mr. BOWIE. If a ginner weighed all of his cotton and reported the weight at the same time he reported the number of bales, what you suggest could be worked out; but the ginnerers do not weigh all of their cotton.

Mr. MACCOLL. But at the end of the season they have to do it.

Mr. BOWIE. They do not then. The best they hope to get is the weight of between five and six million bales, and weigh that as a basis for the average. They do not get the weight of every bale.

Mr. MACCOLL. It might not be as accurate as it would be at the end of the year, but it would be sufficiently accurate to give us a uniform method of expression.

Mr. TAYLOR. Mr. Chairman, I think I can give you a little light on this subject. Mr. North requests his county agents to send in these reports from time to time, but he does not tabulate them until the end of the season. I think we should make a request that he should tabulate these reports, and make his report in 500-pound bales.

Mr. MACCOLL. Let him give it both ways, and then we would have a uniform expression.

Mr. TAYLOR. He admitted to me the other day that he had these reports, from time to time. I have a copy of the instructions sent to their county agents, and in the instructions it is stated that these reports must be sent in from time to time.

Mr. MACCOLL. How are you able to make up your report, which is made up in 500-pound bales?

Mr. TAYLOR. I made a trip here especially to find out how the Agricultural Department is going to make up their report of December 4, as we had asked the ginnerers the same questions, practically, they had asked; and they told me, when I was here, that they would issue it in net 500-pound bales.

Mr. HAYS. I would like to know where you got that information.

Mr. TAYLOR. I got it from Secretary Wilson and Mr. Olmstead.

Mr. OLMSTEAD. I shall have to disagree with Mr. Taylor's statement about that matter. I was present at that interview and I

heard Mr. Taylor's statement. I am ready to testify that while I was there there was no statement to him to the effect that the estimate of the bureau would be made in 500 net pound bales. It would have been a false statement, because we had already decided to make it in gross weight, so that we could not have made that statement. Mr. Taylor evidently misunderstood it.

Mr. TAYLOR. Mr. Burleson is here, and I think he will state that he made the suggestion, in the room, that if you were going to make it, why not make it net. You were then discussing the proposition of making your report in gross 500-pound bales; and he suggested, right there, that if you were going to make it you might make it net.

Mr. BURLESON. Of course I could not tell what conclusion had been reached by the Secretary and Mr. Olmstead at the time the December estimate was made. But I was present, and they asked me what I thought could be done with reference to the matter. Immediately I stated that I thought there should be a uniformity in statistical expression, and that it should be announced in 500-pound gross-weight bales. Mr. Olmstead said that he agreed thoroughly with me about that, and it was done. Of course I do not know how long it had been in their minds.

Mr. OLMSTEAD. We had practically settled on that before that time, as Professor Hays knows, and we asked your advice about it because you were there for consultation.

Mr. HAYS. Mr. Chairman, I never, at any time, thought of any other basis after I thought of it at all. I think I was not in the city at the time of this discussion; but there was evidently a personal misunderstanding on the part of some one, because never, so far as I can remember, did we consider anything but a 500-pound gross-weight bale.

Mr. TAYLOR. I will explain, then, how I misunderstood it. About ten days before this time information came out in the press that the report would be issued in net 500-pound bales, and immediately afterwards our report was issued. We saw, on the day of the publication of the report, that it had been changed from net 500-pound bales, but it was generally understood all over the South that it would be net 500 pounds. I asked them how they were going to deal with this report and they said: "First, we are going to take the acreage reports and we will deduct from that the abandoned acres. We will take the yield per acre and will get the number of pounds by multiplying the net acres, and we will divide that by 3, which will give the net pounds in cotton, and we will divide that by 500, which will give the net bales." Now, those were exactly the words they used.

Mr. HAYS. Officially, I never considered that matter at all.

Mr. TAYLOR. So far as Mr. Olmstead's being present with Mr. Wilson and myself all the time, he was only present about thirty minutes, while I was there for an hour and a half.

Mr. MACCOLL. You were able to convert the crop into net 500-pound bales?

Mr. TAYLOR. Yes, sir.

Mr. MACCOLL. And you think Mr. North could do the same?

Mr. TAYLOR. Yes.

Mr. SIMS. Mr. Chairman, I want to make a short statement about this percentage matter as used by the farmers themselves. I know.

in my district, that it is a term in common use between farmers. One will say: "How is your crop?" The answer will be: "I have got 10 or 15 per cent more than I had last year," or, "My cotton is about 10 or 15 per cent worse." I believe the producers and those who work in cotton have got to using the percentage term almost altogether in expressing conditions. I do not know what caused them to begin to do it, but it is now a very common thing.

Mr. TAYLOR. Mr. Chairman, I desire to say a few words to the committee.

The CHAIRMAN. We will hear you, Mr. Taylor.

STATEMENT OF J. A. TAYLOR, PRESIDENT NATIONAL GINNERS' ASSOCIATION

Mr. TAYLOR. Mr. Chairman, I am opposed to the use of the words Mr. MacColl recommends, but I favor the change to uniformity, and I also favor having the two reports made on the same day.

The CHAIRMAN. I understand, then, that you are agreed upon those two points?

Mr. TAYLOR. Yes, sir. Now, regarding the recent crop report. While in the main this report is very accurate, and I want to congratulate them on the accuracy of it, the very fact that they have missed some States practically 100,000 bales has given the speculators in Wall street, New York, a chance to break the market. Immediately after the December 4 report the market went up, and then, two or three days afterwards, they began to figure around and they found that the Agricultural Department had actually estimated the crop of some States far below what they had actually ginned.

Of course they answer this by saying that when it is reduced to actual pounds it makes up the difference, but it does not account for all the difference. Now, taking the census report of January, admitting that is correct, and take the recent reports which they issued and reducing it to net 500-pound bales or gross 500-pound bales, and using last year's weight, with 6 pounds off—Mr. Hester's report says 6 pounds off, but I think it will be 10.

Mr. HAYS. What do you mean by 10 pounds off?

Mr. TAYLOR. Mr. Hester's report says it is 6 pounds and a fraction, and I use that because it is the nearest accurate estimate that we have. Now here is about the way it runs: In Alabama they are 65,000 bales over; in Arkansas they are 43,000 bales over; in Florida they are 8,000 bales over; in the Indian Territory they are 2,000 bales over; in Louisiana they are 50,000 bales over; in Mississippi they are 98,000 bales over; in Missouri they are 3,000 bales over; in Tennessee they are 74,000 bales over, and in Texas 18,000 bales over.

In Georgia they are 63,000 bales under. In North Carolina they are 76,000 bales under. In Oklahoma they are 65,000 bales under. In South Carolina they are 55,000 bales under. This makes a total of 257,000 bales under and 363,000 over, or, in other words, there are errors amounting to 620,000 bales.

There must be some better system than that which could be used. They ought not to misstate it 600,000 bales, when they come within about 50,000 bales of the actual crop.

The CHAIRMAN. To what do you attribute that?

Mr. TAYLOR. I attribute it to the very fact that they depend largely upon the reports of four or five men for the entire South. They admit that they throw away the reports of these other correspondents, and practically take the reports of four or five special correspondents. I think that is where they make a mistake.

Mr. CANDLER. What remedy would you suggest?

Mr. TAYLOR. Here is the plan I would suggest, and I believe it will not only be very much better, but it will save the Government money. I would suggest either one of two things. If you want to keep both the Census Bureau and the Agricultural Department doing this work, why let them both do it, but let them both use the same county correspondents. One can pay them for the time they work for it, and the other the time they work for it. They are mostly very efficient men. I really would prefer to see both Departments combined under one head. I do not care whether the work is done in the Agricultural Department or the Census Department. All I want is good service. But I would suggest that they both use these county correspondents, and let them, in turn, use the class of correspondents they have among the ginners and merchants in their counties. They could tabulate these reports for every individual county and wire it into Washington. Then the reports would be made up here in Washington, and no man could change them. In other words, they would have to stand as they are. That would make the county man take a pride in getting his county accurate, as the reports would be published by counties, and a man would be seriously criticised if he should make a serious error in his county. I think that would be much better.

You would have 704 county correspondents. Mr. North pays \$5 a day. I do not think it would take over three days' work for one of them to get up one of these reports. He would take a few hours to send out these cards, then a day to compile his reports when he got them in. I think the average would be from 30 to 60 ginners to a man. Then he would have one day in which he could ride around and inspect the crops himself, so that he could see whether these people were reporting accurately or not.

That would cost about \$63,360. I do not know what they spend now on this crop report. That, in addition to about two district agents, one for east of the river and the other for west of the river, who would travel around and look after these county correspondents, would make a better organization.

Mr. FIELD. Do you think it would be possible for a man to inspect a county and make a report on the condition of the crop by just one day's inspection?

Mr. TAYLOR. You do understand me. I would expect him to see the ginners from every section of the county, and perhaps the merchants and bankers from every section of the county. He would not necessarily have to go over the county; but he could inspect very much more of the county than a district man who has a wide territory to cover. For instance, the man in Texas covers the whole State, which has 130 counties. He could be very much more accurate with one county than the other man could with a whole State. I know one instance where the Texas man came up from an east Texas county and reported the crop as pretty fair, when that county will not make 25 per cent of what it made last year.

Mr. BURLESON. I think that Texas man came closer to estimating the crop than any other man.

Mr. TAYLOR. That may be true; but, for instance, the October report for Texas was 68, and last year for the same time it was 69. Now there is a wide difference. That is too much difference.

The CHAIRMAN. The difference may exist, all the same.

Mr. SIMS. You mean the difference was not great enough?

Mr. TAYLOR. I mean the percentage and the crop were too near together to have that difference.

Mr. BOWIE. Of course that is partially accounted for by the difference in acreage.

Mr. TAYLOR. Yes; in part, but only in part.

Mr. LEVER. I understand your idea is to have the same man in the counties collect both the ginner's reports for the Census Bureau and the reports for the Bureau of Statistics?

Mr. TAYLOR. Yes.

Mr. LEVER. Would it not have a tendency, upon his part, for him to make his figures agree?

Mr. TAYLOR. Well, they ought to agree.

Mr. LEVER. That is true; but would it not tend to make him have his ginner's report agree with his estimate?

Mr. TAYLOR. I am going to show you how I would do that. I would suggest that as soon as these census reports are issued from the Office here, the report of every county enumerator should be given out to the public press there, and that the enumerator's books should be open for public inspection right there. There is no reason why these things should be kept secret. The ginner's do not object to the facts being known. I came here and I was assured I would be given every opportunity to investigate a certain report. By making two or three trips to the Department I actually got to see eight county reports.

Mr. HAYS. When was that?

Mr. TAYLOR. About a week or ten days ago; and yet they assured me they would give me every opportunity to examine them.

Mr. HAYS. What was the reason you did not get more?

Mr. TAYLOR. Well, I asked for more.

Mr. HAYS. Who refused it?

Mr. TAYLOR. The authorities.

Mr. HAYS. Who?

Mr. TAYLOR. Who is in charge down there?

Mr. HAYS. I am; and I never refused it.

Mr. TAYLOR. You are not in charge of the Census Department.

Mr. HAYS. I thought you meant the Agricultural Department.

Mr. TAYLOR. No; the only criticism I have to make of your Department is in regard to the States. I think you ought to be a little more accurate about that.

Mr. HAYS. I will take it all back.

Mr. TAYLOR. We show you now that this can be done and that it has been done. We published our report at the same time that you published yours, and here is the result. There is one State, Mississippi, that is out 34,000, another 32,000, next below that is one with 25,000, next to that one with 16,000, next to that one with 14,000, and so on. It all totals up 170,000 bales as against your 620,000. That result has practically been accomplished by this method.

Mr. BURLISON. Did you not use the figures of the Census Bureau for the month preceding?

Mr. TAYLOR. Yes, sir; I have always accepted the Census Bureau report as correct, except the two reports of December and January. The January report disagrees with ours because of the fact that they used from one to seven more days than we did.

Mr. BOWIE. I would like to have you explain that statement. I see that you have made it in the public press, and I would like to have it go on the record.

Mr. TAYLOR. This is the card [indicating] that they used for the January 16 report.

Mr. BOWIE. Call attention to it, and afterwards hand a copy of it to the stenographer.

Mr. TAYLOR. This is the only one I have and I should like to keep it. It reads here: "Number of bales ginned to date from crop of 1905," and "estimated number of bales yet to be ginned from crop of 1905 by your establishment." Now, suppose I am an enumerator and I start out on my trip. I have seven days in which to gather this information. The chances are that on the first day I do not get more than one-seventh of it. At least, the work usually takes up the full time. Now, I come to a ginner here, say on the 20th of January, and I say, "How many bales have you ginned, and how many are you going to gin?" He says, "I have ginned 490 and I am going to gin 10 more." The enumerator puts down 500. You think that information is going to be given to the public; but you don't stop to think if you are cognizant of the fact, that the world compares these figures. In other words, they gauge the size of the crop by the bales ginned. Now, take the record of one county. There were gins in Dallas County that made their reports to the 14th, dated the 16th, and to the 12th, dated the 17th, and to the 20th or 21st, dated the 19th.

Mr. BOWIE. Which one of them was brought up to the date of the ginners' reports?

Mr. TAYLOR. The ginner would not say "I have ginned 490 bales up to the 15th and I have ginned 10 more since that, and I expect to gin 10 more." There is no place on the card for that sort of information. I do not think this was done intentionally; but it certainly did mislead the public.

Mr. CANDLER. What is the difference between the manner in which you get your reports and the manner in which the Government gets their reports?

Mr. TAYLOR. We figure ours on a percentage basis; but we do not claim that our report is absolutely correct. We want it to be in line with the Census Department report, and if it is not we make an investigation to see who has made the mistake.

Mr. CANDLER. You do not get it from the ginners?

Mr. TAYLOR. No; I have not the names of all the ginners. I have tried to get them, but I can not get them. I do not see why it would hurt the Census Department or anybody else to let us have that list.

Mr. CANDLER. Do you know whether the ginners, as a rule, make their reports to the Government?

Mr. TAYLOR. Yes; we have insisted that the ginners do make their reports to the Government. A report has been sent out that we were fighting the Census Department and I wanted to prove that we were not. I wrote numerous letters to a number of individuals who would

write me and say that they did not want to make the report to the Census Department; and I advised them to make the report and make it accurately.

Mr. CANDLER. Do you know what percentage of the ginners do make a report to the Government?

Mr. TAYLOR. I think practically all of them do. It is only in rare cases that they do not, and then the enumerator goes around and gets the information.

Mr. SIMS. Do you want the condition reports made public to everybody?

Mr. TAYLOR. I say let the public in that country have it after it is issued here.

Mr. SIMS. I live in a cotton-growing country, and I want to ask you this question: Would it not be unpopular, as a rule, to report the condition of the crop as high at any particular period; and if that report is to be made public, would it not have a tendency to cause these county agents to make a low rather than a high estimate of it, knowing that they would be criticised in case it did not meet popular approval?

Mr. TAYLOR. I think the people in the counties take a kind of pride in the fact that they have a good crop. The question has been put to me: "Don't you think the ginners could report closer?" Now, a ginner only gins a very small percentage of the total crop, and what good would it do him to say that he had ginned 700 bales when he had actually ginned 1,000? I don't think there are very many men who would do that.

Mr. SIMS. I did not mean that he would intentionally falsify the condition.

Mr. TAYLOR. There is a rivalry among ginners. Here is a town with two or three ginners in it and one gets a little bit of a start on the other, and one ginner in order to keep up with the other fellow will jump 50 or 100 numbers. Now, if the enumerator comes to this ginner himself to get the report he will allow for that jump, in most instances; but occasionally he goes around and gets a report from the bale book, and consequently the report is a little misleading. But there are probably enough who do not report to offset that, so I do not think there is any very great discrepancy there.

In case this work is consolidated into one bureau, I would suggest that a man be put in charge of the cotton department, and another man in charge of the cereal department, and that they should assist each other at different times. One would be a check on the other. In other words, one would represent the North and the other the South in that respect.

Mr. HAUGEN. What organization did you say you represented?

Mr. TAYLOR. I am the president of the National Ginners' Association.

Mr. HAUGEN. What is the object of that association?

Mr. TAYLOR. To collect statistics for the benefit of the ginners and their customers.

Mr. HAUGEN. It is supported by the ginners?

Mr. TAYLOR. Yes, sir.

Mr. HAUGEN. How do you give out information, and how do you collect that information?

Mr. TAYLOR. We collect it directly from the ginners themselves. I figure that there is no man better posted in regard to the condition of a cotton crop in a little community than the ginner, from the fact that he depends on that cotton for his sustenance. In other words, he watches it very closely.

Mr. HAUGEN. The ginners pay the expense of maintaining this association?

Mr. TAYLOR. Yes, sir.

Mr. HAUGEN. For what purpose?

Mr. TAYLOR. For the purpose of getting this data themselves.

Mr. HAUGEN. What good will it be to them?

Mr. TAYLOR. Nearly all ginners grow more or less cotton. In the West the ginners buy cotton in the seed. I presume that west of the Mississippi River and in some parts of Tennessee they buy considerable seed cotton. Probably 25 per cent of the cotton in that section is bought in the seed.

Mr. SIMS. They buy it nearly all in that way in my district.

Mr. HAUGEN. How often do you make a report?

Mr. TAYLOR. We make a report every time the Census Department makes one.

Mr. HAUGEN. Is yours a secret process?

Mr. TAYLOR. Our cards are open to inspection by anybody as soon as the report is out.

Mr. HAUGEN. How is it before the report is out?

Mr. TAYLOR. Of course we keep it secret until the report is issued. And then our report is open to the world.

Mr. HAUGEN. How many ginners belong to your association?

Mr. TAYLOR. We only have about 1,400.

Mr. HAUGEN. How many ginners are there altogether?

Mr. TAYLOR. Practically 30,000. We have a list that was taken from the census list of 1900, which contains 32,000 names; but I am satisfied that there are 10,000 of them who are dead or out of the ginning business for good. We use this list, in addition to our own membership.

Mr. HAUGEN. I understood you to say that you make use of the reports made by the Census Bureau?

Mr. TAYLOR. We recognize the census report is official, and have in every instance, except the two mentioned.

Mr. HAUGEN. How about the statistical reports of the Agricultural Department? Do you consider them at all?

Mr. TAYLOR. Sure; we want them to continue. We want both to continue, either separately or as one Department. I merely suggested a consolidation because of the fact that you could use these county correspondents for both, and one Bureau could use them better than two could; but the two can use them. There is no reason why they should not.

Mr. HAUGEN. I understood you to say that you make use of the reports made by the Census Bureau?

Mr. TAYLOR. Yes, sir.

Mr. HAUGEN. Do you make use of the reports of the Statistical Bureau?

Mr. TAYLOR. No; we do not use them at all.

Mr. HAUGEN. Or the reports of the Weather Bureau?

Mr. TAYLOR. No; we do not use them at all. We use the reports

of the Census Department. For instance, if we are getting out the number of bales ginned to January 16, we get the number of bales ginned from January 1 to January 16 and add that to the previous census report. In other words, we try to forecast what the census report is, and then if we don't agree very closely we can hunt the matter up and find out who is in error.

Mr. LEVER. You do not discredit the reports of the Bureau of Statistics at all?

Mr. TAYLOR. No, sir.

Mr. BOWIE. What is your opinion of the estimate that was given last December?

Mr. TAYLOR. I think that is very close. I think it will be a little bit over, but it will not be over more than 150,000 or 175,000 bales.

Mr. CANDLER. Your organization wants the reports continued by both Departments?

Mr. TAYLOR. Yes, sir.

Mr. CANDLER. If you can not get them combined into one Department, you want them to continue as they are now?

Mr. TAYLOR. So far as I am individually concerned, I think it could be done better in one Department; but it is immaterial to me. That is a mere detail.

Mr. CANDLER. You said that you considered this report, which was referred to a while ago, was very accurate?

Mr. TAYLOR. The report as a whole is going to be very accurate; but there is one fault about it. They make a report that is absolutely wrong in some States, and when you do that you leave a gap open for them to break in. In other words, a chain is just as strong as its weakest link, or a fence that is supposed to keep out hogs is just as strong as its weakest place. For that reason, I think they ought to adopt some better system.

Mr. HAUGEN. When your report is made, what effect has it on the market?

Mr. TAYLOR. We do not want it to have any effect on the market.

Mr. HAUGEN. Does it ever affect the market?

Mr. TAYLOR. Yes; it affects the market somewhat.

Mr. HAUGEN. Always?

Mr. TAYLOR. Sometimes it does, and sometimes it does not.

Mr. HAUGEN. How does it affect it?

Mr. TAYLOR. Sometimes up and sometimes down.

Mr. HAUGEN. How much?

Mr. TAYLOR. I do not suppose it affects it very much. Of course, if we had been in existence longer and had a better standing, it might affect it more.

Mr. HAUGEN. I understand that your report agrees with the report made by the Statistical Bureau of the Agricultural Department?

Mr. TAYLOR. Yes; but then the world recognizes them as official.

Mr. HAUGEN. They do not recognize you as official?

Mr. TAYLOR. No; they do not recognize us as official. Of course, if we were to make two or three reports and they are found to be very accurate we would have a very good standing with the world. Certainly our system of getting reports must be very good or we could not come so close by States, as well as by totals.

Mr. HAUGEN. It seems to me they ought to be most reliable, if you get the reports from the ginnerers.

Mr. SIMS. The Government gets their reports from the ginners also.

Mr. TAYLOR. I will tell you how I think the Agricultural Department could improve their system of getting material and their acreages.

Mr. FIELD. I want to ask you several questions on that line.

Mr. TAYLOR. Let me make this one explanation and then you can ask me questions and I will answer them.

The reason I think our system is better than the Agricultural Department's system in this December 4 report is this: They take the acreage for 1900, given by the Census Department, and they estimate from time to time, for five years. In other words, you have been guessing for five years, and then you take the estimates and obtain the yield of the cotton crop per acre, and you use that. This year it has proven very close as to the acreage, but in some of the States it is evidently entirely wrong. Now I will show you the result: The crop figured out 8,900,000 bales. I knew that was preposterous, and that there was more than that made. So we took the amount of cotton ginned up to the night of the 30th day of January and estimated the amount of cotton ginned after January and made a small allowance. We find that there is a tendency with the ginners to underestimate just a little, and we made a small allowance for that. That is the way we got our results.

Mr. HAUGEN. Why should this be a secret process? Why not give out the information as you get it?

Mr. TAYLOR. The ginners feel that they pay for this information and they would like to have it first for themselves, if they can.

Mr. HAUGEN. Is your report open to all ginners?

Mr. TAYLOR. Yes, sir.

Mr. HAUGEN. Before the report is made?

Mr. TAYLOR. No.

Mr. HAUGEN. Why should that be kept a secret?

Mr. TAYLOR. Up to the time of making the report?

Mr. HAUGEN. Yes, sir.

Mr. TAYLOR. You could not very well hold the ginners together otherwise. They would not be getting any benefit out of it unless it was secret.

Mr. HAUGEN. Do not these reports and these estimates leak out in advance?

Mr. TAYLOR. Yes. That is one thing we have a whole lot of experience in. I didn't have a gray hair in my head when I started into this thing. The hardest proposition I have had is to keep from leaks.

Mr. HAYS. What have you observed as to the effect of your reports on the market?

Mr. TAYLOR. It has been just as I stated a while ago—some do not affect the market any and some have affected the market.

Mr. BOWIE. You bull the market pretty well sometimes, do you not?

Mr. TAYLOR. The reports have been sent out that we are trying to bull the market, but we give it out just as we get it.

Mr. HAYS. Have you ever considered the matter of having a crop-estimating board of ginners to relieve you of that gray-haired business you are talking about?

Mr. TAYLOR. Yes, sir; I have insisted upon it.

Mr. FIELD. I would like to have you answer my questions now. I understood you to say that you were gathering statistics through the South from the ginnerers for the benefit of the ginnerers themselves, because they were cotton buyers?

Mr. TAYLOR. No; not because they were cotton buyers.

Mr. FIELD. You said, in that connection, that they were cotton buyers.

Mr. TAYLOR. Lots of ginnerers are cotton producers.

Mr. FIELD. So it is the producer who wants to know especially about the number of bales of cotton that are going to be ginned?

Mr. TAYLOR. Are you not anxious to know about the number of bales ginned?

Mr. FIELD. I think it is a matter of little consequence to me.

Mr. TAYLOR. Some of them seem to be very much interested in it.

Mr. FIELD. Let me ask you if these ginnerers' reports which you get are not published, and does not the publication of them affect the market?

Mr. TAYLOR. It affects the market just a little, as I stated.

Mr. FIELD. And do they not often vary from the published report of the Government?

Mr. TAYLOR. In the main we have agreed very closely.

Mr. FIELD. In the main, because you have looked largely to the Government reports for comparison, have you not?

Mr. TAYLOR. No, sir; we come out before the Government does. If we came out after it it would be very easy, and we could get ours absolutely correct.

Mr. FIELD. Do you think it is beneficial to the producer of cotton to have conflicting reports published to the world, for the benefit of the world and the speculators?

Mr. TAYLOR. I think it is not detrimental.

Mr. FIELD. Why not?

Mr. TAYLOR. Simply for the reason that if the ginnerers go ahead and collect this information it is a check upon the Government officials.

Mr. FIELD. Suppose there are a half a dozen others compiling statistics and publishing them at different times; would it not cause the condition of the market to fluctuate from time to time?

Mr. TAYLOR. There are others publishing them. There is a prominent board speculator in New York who gets out a report.

Mr. FIELD. Don't you think it would tend to prevent frequent fluctuations if there should be one report a month from the Government to which the people could look for accurate information?

Mr. TAYLOR. The people look to the Government for accurate information now. They do not consider ours as accurate and we do not claim that we are accurate.

Mr. FIELD. Then what is the object in publishing it to the world?

Mr. TAYLOR. We really do not want to publish it to the world. We get it up for the benefit of the ginnerers themselves and their customers.

Mr. FIELD. I can not quite see how the ginner would be greatly benefited by having information as to the number of bales of cotton ginned by another ginner.

Mr. TAYLOR. I will tell you how that is. Say I have got 40 bales of cotton. The next ginnerers' report will probably be issued tomorrow or the next day, and the indications are that it would be

bullish on the market, and the market would go up on it. I would hold that 40 bales of cotton. If it was going to be bearish, I would sell that 40 bales.

Mr. FIELD. Do you not know that in our State nine-tenths of the ginner, outside of the large ginner in the towns and cities, merely buy small remnants of cotton, when there is not a quantity sufficient to make a bale?

Mr. TAYLOR. Yes.

Mr. FIELD. In the large towns is it not the exception that you find a large ginner engaged in buying cotton?

Mr. TAYLOR. No; it is not a rare exception. What part of the State are you from?

Mr. FIELD. I am from Calvert.

Mr. TAYLOR. In the southern half of the State there is not so much of that done; but in the northern half of the State there is a very large percentage of the cotton sold in the seed. There is probably 60 per cent sold in the seed.

Mr. HAYS. Do you get requests for your reports mainly from those who want to buy cotton or those who want to sell cotton?

Mr. TAYLOR. No; we get requests from the ginner in the East as well.

Mr. HAYS. Do you think it would be a good thing to have the census report of the acreage and of live stock every five years?

Mr. TAYLOR. Yes; I think it would.

Mr. HAYS. Especially as long as you use the acreage in figuring your crop.

Mr. BURLESON. It would give a more frequent standard of comparison?

Mr. TAYLOR. Yes, sir.

Mr. BURLESON. I would like to ask Mr. Jordan if he thinks an actual enumeration of the acreage under cultivation every five years instead of every ten years, so as to have a more frequent standard, would be desirable?

Mr. JORDAN. I would prefer it. I would like to see it done every year, except for the reason that it costs so much money. The oftener we can get absolutely accurate information the better it is for the whole country.

Mr. DAVIS. Mr. Taylor, I have listened for two or three hours to these statements and discussions, and I must confess that I am somewhat confused. I understood, when this meeting was called, that it was for the purpose of getting information with regard to and, if possible, improving the system of the collection of statistics and of promulgating them to the world. You seem to be familiar with the Department system of collecting and promulgating statistics on the subject, and also with the system in vogue with the ginner. Will you now, for my benefit, give a concise statement as to wherein you disagree with the methods of the two different Departments, in the collection and promulgation of statistics, and let it be put into the record, so that I may read it over hereafter, if I can not understand it now? State wherein you disagree with the Agricultural Department and Census Bureau in their methods, if you disagree with them, and I anticipate that you must, to a certain extent.

Mr. TAYLOR. In the first place, I disagree with the percentage proposition. I think a percentage based on a normal crop is something

that can not very well be determined, because we do not know what a normal crop is. We do not agree about it. We have been in correspondence with the Department for about twenty years, and I confess I could not tell you what a normal crop is. I have no fixed idea in my mind as to what yield would be a normal crop in my State.

Mr. BOWIE. What do you think it ought to be?

Mr. DAVIS. As you make that objection, give your remedy.

Mr. TAYLOR. I think it should be based on last year's crop.

Mr. BURLESON. Then how would you express it?

Mr. TAYLOR. I would express it in a percentage with reference to last year's crop, say, 10 per cent better or 10 per cent worse.

Mr. SIMS. Would it not be a benefit to adopt an arbitrary standard, say, 300 pounds to the acre, all over the United States, and then always refer to that as 100, as a standard, either above or below?

Mr. TAYLOR. I think it would be better to have the percentage system.

Mr. SIMS. We would know, then, what 100 meant.

Mr. DAVIS. I assume that Mr. Taylor has come here with certain fixed ideas, and I would like to hear them definitely stated.

Mr. TAYLOR. That is what I have advocated. I advocated before when I was here that it should be based on last year's crop.

In regard to the other criticism, I think the manner of gathering this December 4 report is not the best.

Mr. DAVIS. Give us your remedy.

Mr. TAYLOR. I will give you my objections first, in as few words as possible. I am supposing now that they follow this system out, as they told me they did when I was here. They said they took the acreage as given by the acreage reports, which is a series of estimates for five years. Then they deduct the abandoned acres. Then they take this total and estimate the yield of cotton per acre for the entire crop. I do not know exactly their method, but from the information that was given out last year, it seems to me they take the word of their traveling men more than they do that of other people.

Mr. HAYS. That is only done in rare cases, where it is necessary, in the judgment of the board.

Mr. TAYLOR. I understood that was done last year. They did it when the farmers themselves actually told them what the crop was, and yet they threw this information away, and took that from these other men.

Mr. DAVIS. You think that is wrong?

Mr. TAYLOR. I think it is wrong to trust any five men, and I can show you where it could be manipulated. One of these reports is worth many thousands of dollars. For instance, there is one man in New York who could afford to pay \$25,000 or \$50,000 to have one report manipulated. Now, if there are only five men, if he could get next to two of them and buy them up for \$10,000 or \$25,000 apiece, it would pay him.

Mr. DAVIS. Do you think that has ever been done?

Mr. TAYLOR. It is possible, and the events which occurred right here last summer show that there has been something like this done. I think we ought to try to avoid even possibilities.

Mr. CANDLER. You stated that you had had some trouble in this line yourself?

Mr. TAYLOR. Yes; we have had some trouble. I would suggest

also that these county correspondents be made to wire their reports direct to the office here. Let these reports come right here to the Secretary of Agriculture and be kept in his safe until the board comes there, and then they could be run through adding machines and sent out as they are.

Mr. LEVER. You would not have any State or district agents at all?

Mr. TAYLOR. I would suggest that you have about two district agents or traveling men who would look after these county agents. Possibly one might be able to do it.

Mr. LEVER. Would he make any report to the Department at all?

Mr. TAYLOR. For instance, here is a man whose report does not tally with the Census reports as to the number of bales ginned. Well, this man could go there and inspect that man's work and see why it did not agree. Whenever a county did not show up right, he could go there and investigate. You might have an inefficient correspondent, and whenever you found one the head of the Bureau would inform him to go there and see if he could not get a better man. The very fact that you would add about \$100 more to this man's salary would enable you to get a better man.

Mr. HAYS. Have you figured the cost of salaries and the cost of telegraphing?

Mr. TAYLOR. The cost of salaries would be \$63,000.

Mr. HAYS. Just for the cotton States and for cotton alone?

Mr. TAYLOR. Yes; for the cotton States. The cost of telegrams. I presume, would be about \$350 for one report. That expense would not be very great.

Mr. HAYS. Just on cotton, you understand.

Mr. TAYLOR. Yes; just on cotton. Understand, the grain reports are sent in by mail. He could also gather the statistics in his section in regard to corn and oats and other farm products, and not only that, but I think that man could get you a very much better acreage report than your present system.

Mr. HAYS. I suggest that instead of going into great detail on this you take time and write that and send it to me in a suggestion.

Mr. TAYLOR. All right. I think I have enumerated it about completely, though.

Mr. HAYS. I did not hear all of your statement. I was out of the room. County agents at \$60 per month, or \$720 per year, for 2,800 counties would cost \$2,016,000. Telegraphing and expenses at Washington would cost probably toward a hundred thousand dollars more.

Mr. TAYLOR. I will be glad to do that. Are there any questions any of you would like to ask me?

Mr. BOWIE. I want to ask you a question, Mr. Taylor. The official statistics, reduced to pounds or reduced to bales of the same weight, show that the census report has varied from the Department December estimate, taking a period of six years as a basis, only seven-tenths of 1 per cent. The highest single basis of variation was 4.2 per cent in 1904. It was 3.9 per cent in 1903, the rest being very close, and the average for the six years was seven-tenths of 1 per cent. I want to ask you if any reports from any private sources within your knowledge approximate in accuracy the Department estimate made in December?

Mr. TAYLOR. No; I think the Department estimate is the best we have.

Mr. BOWIE. You think it is the best that has been devised?

Mr. TAYLOR. Yes, sir.

Mr. BOWIE. Better than any private agency that has been developed?

Mr. TAYLOR. Yes, sir. Of course, while our system, I believe, will show the best this year, we might not do as well next year. I do not want to advocate our own system.

Mr. BOWIE. I do not say there should not be private statistics. I am not asking you about that. I was asking simply if any statistics from private sources, taking a period of six years, has come as near to accuracy as the estimates of the Department of Agriculture.

Mr. TAYLOR. No, sir. The estimates of the Department are very much more correct. Here and there a man will guess one crop very close, but the next crop he may miss it a mile.

The ACTING CHAIRMAN (Mr. Henry). Have you any questions to ask Mr. Taylor, gentlemen?

Mr. JORDAN. Mr. Chairman, there is one question I would like to ask Mr. Burleson. It is an evil that I see is springing up. It has come to me from a number of counties in which the statement is made that the enumerators of the Census Department are also correspondents of Mr. Price, of New York. We all know Mr. Price is a speculator.

Mr. BURLESON. I know who Mr. Price is, and I undertake to say that if any man's name can be furnished to Director North with the statement that he is the agent of Mr. Price or the agent of Mr. Hoadley, either one, he will be promptly dismissed.

Mr. JORDAN. The point I wanted to ask was this: You said a law had been passed, or rather was pending, putting a heavy penalty upon officers who would give out information. I wanted to know whether or not that law covered all of the employees, including the enumerators.

Mr. BURLESON. It does.

Mr. JORDAN. Does the law go further and say that they shall not be correspondents of any other parties?

Mr. BURLESON. It does not go to the extent of saying that they shall not be correspondents, but it says if they give out any information that comes to them by virtue of the position they hold which might affect the price of a product grown in the United States, they shall be deemed guilty of a misdemeanor and punished by confinement in the penitentiary or by a heavy fine.

Mr. JORDAN. That would virtually preclude them, then, from acting as correspondents.

Mr. BURLESON. If you mean by correspondents that they are precluded from imparting the information they gather in their official position, it would. It would not preclude them from corresponding on some other subject.

Mr. JORDAN. It is with reference to gin reports.

Mr. BURLESON. It certainly would cover that.

Mr. JORDAN. I do not think the enumerators understand that. I think it would be advisable for the Department to write them a letter informing them along that line.

Mr. BURLESON. This law will unquestionably pass, and it has been most carefully drawn. It was submitted to the authorities in the Department of Justice and to the Secretary of Agriculture, and he

gave it his hearty approbation. It was drawn just as stringently as it could possibly be drawn to cover every possible official who gets this information in the position he holds. I think you will find the law will be effective when it goes upon the statute books.

Mr. JORDAN. I just wanted to call the attention of the committee to that, because I have received quite a number of letters giving me that information. Of course I have no way to prevent it, but at the same time I see that it might result in an evil.

Mr. BURLISON. Certainly it would. It would be a crying evil if that condition obtained.

Mr. BOWIE. It is one of the reasons for the passage of that law.

Mr. JORDAN. I am very glad to know it is so broad.

Mr. BURLISON. I will undertake to say to you, Mr. Jordan, that as soon as this law is passed Mr. North will have the text of it communicated to every man connected with the Statistics Division.

Mr. JORDAN. And that will probably break it up.

Mr. BURLISON. Yes. Mr. Chairman, Mr. Peyton, of Mississippi, would like to be heard for a few minutes.

Mr. JORDAN. Before I sit down I wish to make this further statement: There has been an effort made, by two or three questions asked me, to undertake to create the impression that our effort to put the tail end of this crop around 14 or 15 cents is done to put the price of cotton abnormally high. I want to state to you gentlemen that the spinners who have talked to me have said to me in the last two months that they could pay 14 cents a pound for cotton, and our whole effort in trying to advance the price of cotton in the tail end of the season was to try to average the crop as near as we could at about 11½ cents. I do not suppose any spinner would deny that they could have paid 12 cents for the whole crop and made money. So I do not want you gentlemen to be under the impression that we were trying to advance the price abnormally high, because we recognize that the spinners are our best friends, and we never want to do anything that would jeopardize their interests. We simply asked for a square deal. That is all.

Mr. FIELD. I would like to ask Mr. Jordan whether he is aware of the fact that there is great diversity of opinion even among the farmers' organizations as to whether it is proper to fix the price so high as 15 cents? In other words, are you aware that the farmers' union, I believe they term themselves, in the State of Texas, claim that the price is fixed too high?

Mr. JORDAN. Yes, sir; but I also have a letter from the president of the farmers' union in which he has put himself on record as being absolutely on the 15-cent proposition, in order to average the crop.

Mr. FIELD. Who is that—Mr. Montgomery?

Mr. JORDAN. Mr. Calvin. If he has repudiated that, it is up to him.

Mr. FIELD. I know Mr. Montgomery's position.

Mr. JORDAN. Mr. Montgomery is simply a field organizer. Mr. Calvin is the president.

Mr. FIELD. I received a communication from him purporting to speak for that organization. Whether he does or not I do not know.

Mr. TAYLOR. They advised them last year, early in September, to hold for 12½ and 13 cents, when we had a 13½ million bale crop.

Mr. LOVERING. I would like to ask Mr. Jordan, if I may, what has been the average price received for the crop this year?

Mr. JORDAN. So far, I should judge it would be somewhere between 10 and 11 cents.

Mr. LOVERING. I should like to ask him what he thinks cotton can be made for?

Mr. JORDAN. It possibly might be made for somewhere between 9 and 10 cents.

Mr. LOVERING. As high as that?

Mr. JORDAN. That would carry a little profit with it. I suppose on a cost basis we can produce it at 8 cents.

Mr. LOVERING. The average crop would be 8 cents?

Mr. JORDAN. Yes; I suppose we could get out with it paying 8 cents.

Mr. LOVERING. Then again I would like to ask him if the spinners who told him they could afford to pay 15 cents for cotton are New England spinners?

Mr. JORDAN. No, sir; they are southern spinners.

Mr. LOVERING. I do not know of any spinners who can afford to pay 14 cents for cotton.

Mr. JORDAN. They told me this, Mr. Lovering, that they were making No. 10 yarns and getting 21 cents a pound for them; and they said 7 cents would cover the cost of manufacture and leave them a good margin of profit; that from 21 cents leaves 14 cents, and I also know that Fall River is selling—

Mr. LOVERING. When you say 14 cents for cotton, you mean for cotton and waste. It would be very nearly 16 cents.

Mr. JORDAN. They told me they could afford to pay 14 cents for it. I suppose they had those figures worked out.

Mr. LOVERING. I am very familiar with the cotton manufacturers of New England, and I am absolutely sure that unless it be for some very high grade of cotton they could not pay any such price as that.

Mr. JORDAN. Are you not willing to admit this, that a few years ago when you got our cotton at 5 cents a pound and sold your print cloths at 2 cents a yard that gave you 14 cents for the cotton and left you a margin of 9 cents?

Mr. LOVERING. No; because you have got to reckon cotton and waste.

Mr. JORDAN. You had 9 cents in there. I do not know the details that go to make it up.

Mr. LOVERING. I did not propose to enter into a discussion upon that point.

Mr. JORDAN. Very well, sir.

Mr. BURLESON. I would like to suggest that it does not have any bearing upon the proposition as to whether we should have correct statistical information upon this subject or not, because whether it could be grown for 5 cents a pound or whether the spinner could afford to pay 15 cents a pound is immaterial as far as having correct statistical information is concerned.

Mr. JORDAN. I simply rose to make that statement because I did not want the gentlemen to receive the impression that we were trying to force an abnormally high price for that cotton.

Mr. LOVERING. But it was only because Mr. Jordan made that statement that I asked the question.

Mr. JORDAN. And I think I can maintain my position.

STATEMENT OF HARRY PEYTON, OF MISSISSIPPI.

Mr. PEYTON. Mr. Chairman, I feel quite an interest in the discussion of this matter because I am a grower of cotton in quite a very extensive way, and I watch the course of prices. There is only one subject I care to mention. That is the question of percentages. I think that alone is entitled to very much of the time of this committee, if something beneficial can be worked out for the Department of Agriculture.

As a preface to anything I may say hereafter, I wish to have it known that I am most heartily in accord with the work of the Department of Agriculture and the Census Bureau. The cotton growers of the South are dependent not only upon the industry, but upon the ability and the honesty of those Departments for protection in the sale of their products.

Mr. Chairman, I took the trouble last October to prepare some ideas upon the question of promulgation of statistics—that is, of condition reports and the effect that those reports had upon the cotton market, not only upon the question of contracts, but upon the question of spots themselves. It is the misinterpretation, the indefiniteness, I might say, and the misconstruction that is placed upon the condition reports that affect so seriously the cotton. Mr. Chairman, these reports can be only good by way of comparison. They are taken and accepted by the world only by way of comparison.

When we make a report in October of 71.2, we immediately ask what that means. What does 71.2 mean? 71.2 of what? The practical man will ask that and he will run back to former years. He will say, "Let us get an acreage of 27,000,000 acres, and let us put to that acreage the application of the 71.2 October report." He applies it to one year and gets one result, and he applies it to another year and gets another result. Therefore, the percentage that is put out by the Department of Agriculture without qualification is used as a football to be kicked about by speculators at the expense of the cotton. If the Department of Agriculture can improve somewhat on that system, then I think they have accomplished a very great deal.

Mr. BURLESON. Have you any suggestions as to how it can be improved?

Mr. PEYTON. I think you will have to put it on some kind of basis of last year's crop, or say what the normal production is. The normal yield of cotton for the last ten years is 197 pounds, but there is figured in that ten years three abnormally large crops of more than 220 pounds. Therefore we are in a domain of uncertainty when we put an application of these figures to any kind of an average yield. Therefore it seems to me it would have to be put upon the yield of the previous year, or upon some abstract basis of, say, 200 pounds, or whatever figure you might have. Then we would know what it meant. I do not want to trespass upon the time of the committee, because you have listened to almost every field of discussion, and it is only on this one subject I care to be heard.

Mr. BURLESON. Have you carefully prepared some remarks on the subject? If so, leave them with the committee and let them be embodied in the proceedings.

Mr. PEYTON. I would like to change them a little, because this was written last October, just after the promulgation of the 71.2 report.

Mr. BURLESON. Change it and send it to the clerk of the committee.
Mr. PEYTON. I said at that time:

The producer of cotton is paying the price of an October guess on condition as 71.2 per cent. Of what, no one knows. It may mean a crop of 11,800,000 bales and a price for the same of 7 or 8 cents, and by comparison with other years it may mean a crop under 10,000,000 bales, which would insure a price of 10 or 12 cents, the margin or range of values between the two extremes being from \$10 to \$20 per bale on from 6,000,000 to 8,000,000 bales of cotton, aggregating the startling amount of from \$60,000,000 to \$100,000,000.

Mr. Chairman, there is a variation, I say, on this one crop that can, by the application of these figures by way of comparison one year with another, make a difference on the cotton crop of \$60,000,000 to \$100,000,000. It seems to me that as to anything that can be used in that way if there can be any qualification put to it to destroy that speculative feature of these reports it ought to be done.

Before the promulgation of this October 71.2 report the farmers were supplying the spinners with abundant cotton around 10 cents per pound profitably and satisfactorily to both. The moment the October report of a condition of 71.2 came out speculation seized upon the figures and manipulated them into a showing of an 11½ or twelve million bale crop, to the expense of the producer of about \$7 per bale, or from \$40,000,000 to \$50,000,000 upon the value of the crop unsold. If the 71.2 was an infallible index of the size of the crop, the decline in price would be fully warranted, for 12,000,000 bales is more than the world requires. By way of comparison to be hereafter made, this estimate or guess is not only not infallible, but the chances are more than even that it is entirely wrong.

I will just make one comparison of this report. When that October report of 71.2 came out I had been all over the South—last October. I had been to Texas, Louisiana, and Mississippi. I am a Mississippian, and am raising cotton in Mississippi and Louisiana. I have seen nearly all the crops of the South. I have seen the crop of the South twice every year for the last ten years. I am connected with the Department of Justice, and my duties carry me over the country pretty generally. I am somewhat practical in cotton. I have plowed; I have hoed; I have picked it; I have done everything to be done in a practical way with cotton, and having seen the crop twice a year, I am enabled to form some kind of judgment as to what the production will be. I have talked with seed men—the men who crush the cotton seed generally have good ideas of crops—and I came back and I was satisfied that the probable production of this crop was about ten or ten and a half millions. But the 71.2 report came out.

Mr. Price and other buyers considered it, and by comparison, not with a series of ten years, but by comparison with the crop of the former year, it showed a possible production of 11,800 bales of cotton. What was the result? The result was that cotton broke \$8 a bale almost instantly, and it stayed down. December cotton contracts went to 9.50, and I think March contracts went to 9.80, and spots in proportion, though not quite as much as it used to.

Here is a comparison. In 1904 an October condition of 75.8 yielded 225 pounds of lint per acre. In October, 1905—that is, this last year—an October condition of 71.2 yielded 4.6 less per acre, or 10.35 pounds less per acre than 225 pounds in 1904, which was 214.65 pounds per acre. In other words, a condition of 71.2 in October, as compared with the former year, yielded an average yield of 214.65 pounds per acre. This applied to 27,000,000 acres. That was the way any man would have done it by way of comparison.

He would have said: "How much did we make per acre? Two hundred and twenty-five pounds on such and such a condition—October condition. This year we get an October condition of such and such, which is 4 per cent less; therefore we will make 4 per cent less than 225, which is 214 pounds. How many acres have we? 27,000,000. Then if we have 27,000,000 acres, and the probable production is 214 pounds per acre, we have a crop of 11,592,000 bales, and, adding the linters and town cotton, we would have a crop of 11,892,000 bales." And that is exactly what Mr. Price and that coterie of speculators did in that market. Now, I say, gentlemen, with due deference to the Department of Agriculture—because I have the utmost faith in the integrity and ability of those officers—it is a question of experience in devising some way or means to keep these reports out of the sphere of speculation and manipulation and the depression of cotton at the expense of myself and other growers.

We have here the groundwork, the foundation, for these big estimates. Now for an analysis and comparison: The average yield per acre for the past ten years has been, in round figures, 197 pounds. As this is from counted crops and weighed bales upon some reasonable and ascertainable basis of acreage, we may assume that the average is in the main correct. In fact, to practical producers this is about a reasonable average production. In only three of the ten years, and only three times in thirty-five years, has the production exceeded 220 pounds of lint per acre. In 1887 it was 222 pounds. In 1888 it was 221 pounds, and in 1904 it was 225 pounds. In 1891 it was 215 pounds. The yields of more than 220 pounds are more than 20 pounds above the average of seven of the past ten years, 56 pounds above the yield of 1895, and 49 pounds above the yield of 1903.

That is, the 214 pounds that we were calculating was going to be applied to the 27,000,000 acres, which would make the crop of 11,000,000 bales.

In the last above demonstration, showing a yield of 11,892,000 pounds, the basis is evidently the Government's October percentage of 71.2, being 4.6 per cent less than last year, which shows an acreage yield for this year of 2144 pounds per acre, 17 pounds more per acre than the average yield for ten years, and 41 pounds more than the yield for 1903 per acre.

Mr. TAYLOR. Mr. Peyton, do you remember the November report that was issued just after that, a month later?

Mr. PEYTON. Yes.

Mr. TAYLOR. It practically confirmed that report, did it not?

Mr. PEYTON. I can not recall. I would not like to answer that question.

Mr. TAYLOR. Do you remember the effect it had on the market?

Mr. PEYTON. I do not now recall. I have this in mind now, and I have forgotten. I did not follow the market very closely. I know I did not sell my cotton. I have it yet.

Is there any sound basis for any such reasoning as this?

I was arguing then the question against the very large crop, which I do not care to go into. That is about all I want to say to the committee, and my purpose in saying it is to put the matter not so much before the committee as before the Department of Agriculture for what it is worth. I do not know that I can suggest any means whereby speculators can be kept out of statistics, because they will seize upon statistics.

Mr. BURLESON. Do you think Mr. Taylor's suggestion to make last year's crop a basis would be a good one?

Mr. PEYTON. There ought to be something of that kind.

Mr. OLMSTEAD. The method by which that immense crop was figured upon that basis was exactly upon last year's crop. If they had taken a ten years' average, they would not have arrived at such a production. They took last year, which is just what you are arguing for.

Mr. PEYTON. Exactly. It is so hard to make a comparison.

Mr. CANDLER. They took the last year's crop and figured from that, whereas the Department of Agriculture took the ten years' average and figured from that, and the people did not know the basis upon which these two calculations were made, one person basing his calculation on last year's crop, while the other was basing the calculation upon a ten years' average. If people had known generally that the figures of the Department of Agriculture were based on a ten years' average, they could have figured on that, and they would have disproved this basis figured from last year's average; but if they would make an absolute basis, last year's crop, or 200 pounds, or some definite basis from which they can figure, and let that be generally known, they can arrive at it.

Mr. PEYTON. Certainly. The idea is this: The Department of Agriculture would never have put out a figure of 71.2 if they had been putting it out against the last year's crop. Then we would not have this trouble.

Mr. OLMSTEAD. It is an argument against the use of the last year's crop as a basis, too.

Mr. PEYTON. If the public knew it was put out that way, it would not do it.

Mr. TAYLOR. If the basis were the previous year's crop and it gave a condition of 90 per cent, it would not be very hard for the average farmer or anybody else to figure that out.

Mr. PEYTON. I very much agree with the gentlemen from New England. I do not believe any figures ought to be put out at all. Let the Department of Agriculture keep their figures to estimate their crop on, if they want to, and if that helps in determining in December what the yield is, it is all right for them to keep them; but so far as the growing crop is concerned, I believe that speculation will be robbed of very much of its ammunition if we would say the crop is good or fair, or just take the general condition of the crop and let the ginners' report go along with the report of the Department of Agriculture, starting in the month of September.

Mr. TAYLOR. That would be all right, possibly, for the summer, but the time has come for the September report. When the farmers are marketing their crop they would like to know what the crop is. For instance, if the Department of Agriculture would come out and say the crop was 105 per cent—that is, this year now, say next September—and the crop was 10,000,000 bales, for instance, the average man could multiply that very easily and tell what the crop is.

Mr. PEYTON. This would be my suggestion on that, Mr. Taylor: The Department of Agriculture, when they have ascertained the acreage, and ascertained it as soon as it can be done, because you can not have any basis to work upon to arrive at anything like a sensible conclusion unless you know something about the conclusion—it is absolutely necessary to point out as much as you can about the acreage—can then say what the normal crop is.

Do not say "normal" without saying what normal means, because you will have a variance of millions of bales if you leave it to the speculators on the one hand and the producers on the other to say what normal is. Let the Department of Agriculture then say it is 82 per cent of a normal crop average of ten years, which was so many bales, according to the acreage it produced. In other words, if a normal crop is 200 pounds per acre, and we have an acreage of 27,000,000, multiply the 27,000,000 by the 200 pounds and get your normal crop on that basis, and then let this percentage have application to that normal crop. Then everybody can understand what it means.

The ACTING CHAIRMAN. Would you not consider a ten years' average a fair basis?

Mr. PEYTON. I think so. There is this difference, from a practical standpoint. I can remember when Mississippi was the leading cotton State. Texas came along then with her great acreage and took the prestige away from my State. Now comes along Georgia, not because Georgia has increased her acreage or Mississippi has lessened hers, and South Carolina and Alabama, all raising about as much cotton as Mississippi. It is because there has been a continuous increase in the production per acre in those States by the use of fertilizer; and it is rather difficult to determine with very much accuracy a basis of ten years, because I doubt if Georgia ten years ago made more than 175 pounds per acre, while to-day she makes about 225 pounds per acre by the use of fertilizer.

Mr. SIMS. I would like to ask Mr. Peyton a question. Is it not a fact that the condition report for June, published in July this year, was worth almost untold millions of dollars to the cotton producer of the South?

Mr. PEYTON. That is not the question. It is not a question of the benefit to the producer of the South or to the mills. It is a question of getting something out that is accurate. If we are going to make 13,000,000 bales of cotton and the world does not need but 10,000,000, the producer has no right to his high price. If we are going to make 10,000,000 bales of cotton and the world needs 12,000,000, then we are entitled to it.

Mr. SIMS. Has not that been maintained to be correct by the yield since?

Mr. PEYTON. The June report?

Mr. SIMS. Yes.

Mr. PEYTON. I do not remember what that report was.

Mr. SIMS. Seventy-seven.

Mr. PEYTON. What did it indicate the production of?

Mr. SIMS. About 10,000,000 bales.

Mr. PEYTON. Why, certainly. My idea is to get at some basis that will prevent the wide range of speculation on the percentage reports.

Mr. FIELD. Does there seem to you to be any good reason why, if the Government, say, on the 1st day of May, should put out its estimate of 72 per cent, it should not say it means so many bales?

Mr. PEYTON. None in the world.

Mr. FIELD. It is known to be a May estimate only, and the next month it can say 73 per cent. Is there any reason it should not say, "This means so many bales?"

Mr. PEYTON. None in the world.

Mr. FIELD. Does not that answer the very objection you have made, that there is no basis?

Mr. PEYTON. If it does not mean anything, we ought not to put it out.

Mr. FIELD. It occurs to me they might just as well say bales when they say per cent.

Mr. PEYTON. I think it would be better to get it on some basis of normal yield, so that everyone would know exactly what they were figuring against. Of course a report in May of 75 or 80 or 90 does not mean anything. I went and looked at my cotton last May in Louisiana and I thought I had an excellent prospect for a crop, and I made absolutely nothing.

Mr. FIELD. It is known to be a May or June estimate?

Mr. PEYTON. Certainly. It was only in order to call attention to this one question that I desired to address the committee. Of course what I have said may be of no value at all, but there might be some grain that would come out of it that would be of some benefit in making up this report. I think, as I stated before, that the basis of all this statistical information is the question of acreage. Then the next important question is the question of the production of lint cotton per acre. When we get those two things we can tell something about the crop.

Mr. TAYLOR. Mr. Chairman, I overlooked one thing. The reason why I think this other system is better is the fact that in this plan here you would only really have to estimate about 30 per cent of the cotton, while under the old system you have practically got to estimate the whole crop, because we take as a basis the amount already ginned up to the night of the 30th of November, which is about 70 or 75 per cent of the crop. That is the reason, I think, you have a much smaller part of the crop to estimate. The other part is already known.

ADDITIONAL STATEMENT OF W. M. HAYS.

The ACTING CHAIRMAN. Mr. Hays, have you anything further to say?

Mr. HAYS. Mr. Chairman, I really have not much to say in concluding our part of this hearing.

The impression has been a little too strong, I think, that I have suggested many changes. I have not suggested many changes in the plan, except on the one thing of making the reports safe, so there will not be leaks, and on this one matter that Mr. Peyton has presented so forcibly of getting a way of expressing to the public the real facts.

With regard to the matter of changing to the States and having the computing done there, if you please, this board scheme that has worked out so well, having 40 men interpreting those figures and adjusting them, weighing them, as it were, by the agencies that make the reports—there is very little change in that.

Mr. BOWIE. You mean four members. You said 40.

Mr. HAYS. We have four on the board, but if the weighting is practically done by these district chiefs, then the board here in Washington becomes merely an agency for keeping out leakages and to tabulate the reports—not for estimating. They tabulate. The dis-

strict chiefs are the responsible men, so far as weighting, whether this man's average shall be followed for a county or that man's average. In other words, the estimating part of it will be done by men who travel over the territory and know the men who make the reports, rather than by the board here. The system is practically the same as now, other than that we simply have the men do the work a little differently, and we have proved that to be a good thing. It is done mainly in the interest of having it secret. Then those telegrams can all come direct to the Secretary's office, and they are not opened until the board is in session.

Mr. LEVER. I understand your district agents supplant the present State agents.

Mr. HAYS. The whole thing is merged together. You can not say it is supplanted. Nothing is supplanted. We have some traveling agents, and some State agents, and some township agents, and some county agents, and some individual reporters, and some ginners have been reporting to us; and we will keep all of them, subject to the revision of this man who makes up the list of those who report to him, including these county reporters, who report here. He will pick out the county men; not that he will communicate with them afterwards, but if one fails us in a county he will advise us in that county who to put in his place.

Mr. LEVER. In other words, you have a man in a district giving all his time and attention to that work and giving him a living salary?

Mr. HAYS. Giving him a living salary and giving him traveling expenses, and we will provide that he will have no other work, but make this his first and only work.

Mr. LEVER. Whereas your State agents do not give all their time to it?

Mr. HAYS. No, sir.

Mr. BOWIE. How much is this additional expense that you think ought properly to be incurred?

Mr. HAYS. It will depend on how rapidly it is taken up.

Mr. BOWIE. I mean in your estimate, which we have as a committee to pass on.

Mr. HAYS. I have not fully computed them. It will be somewhat higher than the estimates of last year, and I have waited purposely until this hearing is over to make up my mind how fully this was going to be accepted and how much to make those estimates.

Mr. BOWIE. You know next week the subcommittee begins its work of actual preparation of this bill, and it would be a help to us to know exactly how much more money you recommend than you are now getting.

Mr. HAYS. Well, the Secretary, last fall, when the matter was being investigated, placed in the bill \$20,000 more, raising the appropriation for that Bureau from \$196,000 to \$216,000, and the only question that is now up is how much more should be added to that. It will not need to be very much more. It will depend somewhat on the policy we pursue, and we are just now reviewing the matter in detail, and it is a matter that takes a little time to do. We will have some statement ready very soon. It may not be more than \$216,000. It probably will be something more.

Mr. BOWIE. Your current estimates, then, call for an increase of \$20,000?

Mr. HAYS. Yes, sir.

Mr. OLMSTEAD. That does not appear in the Book of Estimates, however, does it?

Mr. BOWIE. Yes; I had it here before me, but I did not know it. He has recommended \$20,000. I want to know whether that is his present opinion, however.

Mr. HAYS. It ought to be more than that, I should say, but I have not talked to the Secretary about it in a definite way.

Mr. BOWIE. Then you will give us the information before the bill is prepared? You will give us your final opinion?

Mr. HAYS. Yes. I want to say this one thing: Some clerks who are now in Washington can be transferred out to assist these people in the field, so we will need a little change in the statutory roll. That we will work out in detail and give it to you so that you can see how much to put under the lump sum and how much in the statutory list. That is all nearly worked out.

Mr. TAYLOR. Do I understand you are going to use some of these clerks as these district agents?

Mr. HAYS. No; for their helpers. A good many of the traveling agents and State agents—I say a good many; we have not decided on how many—will be utilized. Of our traveling agents, by the way, we have transferred two or three to other work and two have recently died, so that instead of having ten I think we have five now.

In closing I want to say that this matter of a formula (if I may use that term) means of expressing the facts at the end of the month to the public and of expressing the facts brought together by these different agencies, including the Weather Bureau, week by week, or even day by day, if a sudden storm affects an entire crop, is one of the most important matters and one of the most difficult. It is being studied, and we are very glad to have these suggestions. They have cleared the matter up in some ways. A suggestion of Mr. MacColl has made the subject even more difficult than it seemed before, but we need to know our difficulties in order to find some solution. We want to get these facts out so that the fluctuations in condition are the only things that jar the market, so that we keep the market quickly supplied with the facts all the time and immediately after a product is harvested.

I know that Secretary Wilson will be, on the whole, very much pleased with the discussions you gentlemen have given here to-day, and with the universal encouragement you have given by your statement of faith in this general work. Secretary Wilson has stood up for these estimates because he believed them to be in the interest of the people who produce and of the people who consume, and he has stood fast, no matter who has said things against the system. He has done it, gentlemen, as I come to see it, not in the light of the experience I have had for only seven or eight months, but of nine years of actual experience with these reports; and I am sure that all in the Bureau are more firmly in the faith to-day that this is a good thing to do as a national matter than ever. No one there expresses any doubt as to the wisdom of this class of reports.

I thank you, Mr. Chairman.

The committee, at 4.45 o'clock p. m., adjourned.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
Wednesday, February 21, 1906.

The committee met this day at 10.30 o'clock a. m., Hon. James W. Wadsworth in the chair.

**STATEMENT OF MISS JOSEPHINE A. CLARK, LIBRARIAN,
DEPARTMENT OF AGRICULTURE.**

The CHAIRMAN. Miss Clark, we notice in your salary list several changes submitted, and the amount of increase is about \$2,880. The first change we notice is four clerks at \$900 each; that is, four new clerks at that rate of pay. Will you please tell the committee what is the need of that?

MISS CLARK. Two of those were \$840 each before, and those were increased to \$900 each because of their long service. Three of them were increased from \$840 to \$900, and one transferred from the Secretary's roll at \$900, because that clerk who was on the Secretary's roll was detailed to the library.

MR. SCOTT. How long has this clerk been actually working in the library?

MISS CLARK. Five years, I think.

MR. SCOTT. But has been carried on the Secretary's roll all the time?

MISS CLARK. Yes; it is really work of the Department, and not library work. All the foreign mailing lists are kept in the library: all the publications in the Department sent to foreign countries pass through the library, and an account is kept of the postage and all the bookkeeping relative to that, and the Secretary has placed that under the library, in the charge of the librarian, in order to keep that record. It is not strictly library work.

MR. SCOTT. It is not a new expenditure?

MISS CLARK. Oh, no.

The CHAIRMAN. Do you propose to transfer that to your Bureau?

MISS CLARK. Yes; because the chief clerk desires to have the three positions which have been carried by the Secretary for the library transferred to the library.

The CHAIRMAN. Yet it is not library work?

MISS CLARK. That particular one is not. That is one of the \$900 clerks.

MR. SCOTT. That clerk has been getting \$900?

MISS CLARK. She was promoted last July.

MR. SCOTT. I understand, then, that this paragraph of four clerks at \$900 is made up by the addition of this one clerk who is now getting \$900, and by the promotion of three other clerks who are getting \$840 now?

MISS CLARK. Yes, sir.

MR. HENRY. How many new clerks altogether are provided for here?

The CHAIRMAN. One by transfer—

MISS CLARK. From the Secretary's roll.

The CHAIRMAN. Is that one of the four \$900 ones?

Miss CLARK. Yes, sir.

The CHAIRMAN. And the other three of these \$900 ones are promotions from \$840?

Miss CLARK. Yes, sir.

Mr. HENRY. You have only one clerk?

The CHAIRMAN. No.

Mr. HENRY. Here are two more clerks at \$720 each.

The CHAIRMAN. One is new, and one is promoted. Is that it, Miss Clark?

Miss CLARK. Which one is that?

The CHAIRMAN. Two clerks at \$720 each are submitted.

Mr. BOWIE. One clerk at \$600 dropped.

Miss CLARK. If I had my roll here I could tell. It is difficult to tell in this form, which I have never seen before.

Mr. HENRY. I simply want to know how many clerks you are asking for?

Miss CLARK. No new clerks.

Mr. HENRY. You have them already?

Miss CLARK. Yes; they are all in the library at the present time—

Mr. HENRY. But paid for on the Secretary's roll?

Miss CLARK. Yes, sir.

The CHAIRMAN. Last year we thought we changed all that, so that each clerk should do work in the bureau or division from which he was paid.

Miss CLARK. The Secretary was allowed to detail from his roll. He allowed these three; one because she was doing Department work, and the other two had been in the library for several years, one at \$840 and one at \$720.

Mr. HENRY. So that really you are asking for no new clerks?

Miss CLARK. No, sir; three are to be put on the statutory roll of the library instead of on the Secretary's roll for two reasons. In the first place, the Secretary wishes those places for himself, and, secondly, it is an advantage to the library, because that work must be done, and there is danger of these three being taken away at any time, so that the work of the library would be crippled by these three being subject to the Secretary's disposal.

The CHAIRMAN. You say that one of them is not at all doing library work?

Miss CLARK. No, sir.

Mr. HENRY. Foreign mailing?

Miss CLARK. Yes. All the bureaus in the division maintain foreign mail lists, containing addresses, to which they send their publications.

Mr. HENRY. We knew there was such a clerk there.

Mr. SCOTT. Why is not the logical place for such a clerk in the Bureau of Publications?

Mr. HENRY. The Secretary prefers to have it here?

Miss CLARK. Yes; to keep account of postage. It is in the same building with the mailing room.

Mr. BOWIE. It may be a question of convenience on account of desk room and things like that?

Miss CLARK. Yes; it is convenient, and the library receives a great many exchanges from foreign countries, and keeps somewhat in touch,

with the exchanges. The Secretary has put under the librarian's charge these exchange lists and the requests, preferring as many as possible to be paid for and limiting them as much as possible, and exchanging others for our publications. But we refer a great many requests for publications to the superintendent of public documents, to be purchased from him unless we receive some benefit from the institution that makes the request.

Mr. SCOTT. What, briefly, does your assistant librarian do?

Miss CLARK. She acts, of course, in my place when I am away, and she has general reference work; and also, if there is any special work that comes up, she attends to it, as in the case of revisions of any part of the classification, as the library grows and the necessities demand. She does that. She is a cataloguer as well.

Mr. SCOTT. She helps with the cataloguing, does she, when she has nothing else to do?

Miss CLARK. She does not catalogue regularly, but if there is any special cataloguing to be done, she helps.

Mr. SCOTT. Are you able to keep up the work with the four people you have?

Miss CLARK. It is impossible to keep the cataloguing up with any number.

Mr. SCOTT. What does this "clerk, who shall be translator," do?

Miss CLARK. She is more for the Department in general than for the library. There are a great many letters which come to the Department in all languages, to the Secretary's office and to the other bureaus and divisions. She translates those, and then often there are extracts and pamphlets coming to the bureaus and the divisions which need translating.

The CHAIRMAN. What languages is she expert in?

Miss CLARK. She translates in most of the modern languages. I do not think she translates in Norwegian or Swedish, but most of the modern languages—French, German, Italian, etc.

Mr. SCOTT. In a general way, what do the rest of your clerks do?

The CHAIRMAN. Are your clerks all women?

Miss CLARK. Yes; they are all women. We have three messengers who are men.

Mr. SCOTT. But in a general way, what do your clerks do?

Miss CLARK. Next to my assistant, the assistant librarian, in the purely library work, is the cataloguer, who has charge of the catalogue revising, and she is the head cataloguer. Then the three cataloguers work under her with accessions to the library.

The CHAIRMAN. That is, constantly?

Miss CLARK. Yes, sir. She does the cataloguing of periodicals—one of those does—and she also receives the periodicals and also keeps an account of all the current periodicals, and also, the incumbent of one of these \$1,000 positions has charge of the binding of periodicals.

Mr. LAMB. How many volumes have you?

Miss CLARK. Over 90,000, exclusive of the publications of other Departments.

The CHAIRMAN. You have over 90,000 now?

Miss CLARK. Yes; that is, exclusive of the publications of the State, War, Navy, and other Departments. Then one of the \$900 clerks mentioned is in charge of the foreign mailing. One of those

does cataloguing also, in connection with some clerical work in relation to the printed cards for the Department of Publications, which we issue, and one of those is the loan clerk, at the loan desk, and the other—excuse me, I am trying to think of the duties of the four.

Mr. SCOTT. Never mind; I do not insist upon particulars; I wanted it in a general way.

Miss CLARK. The work is divided up quite closely, but all of the clerks are familiar with all the work of the library, as is necessary in the case of vacations, when they exchange work, and they are all familiar with all the work of the library. But to facilitate the work we divide it up definitely as to just what their specific work shall be.

Mr. SCOTT. About how many of your clerks are engaged in answering calls upon the library?

Miss CLARK. The loan clerk devotes her entire time to getting books, charging them, and answering the demands made over the telephone; and then the assistant librarian does that, too, and, as we are all in the main library and accessible, anyone is liable to be called upon.

The CHAIRMAN. You do not loan books outside of the Agricultural Department do you?

Miss CLARK. Do you mean to the city, miscellaneously?

The CHAIRMAN. Yes; to anybody.

Miss CLARK. Occasionally we do, if the person is undertaking some special work and can not get the information he desires anywhere else. If he gives good references and knows somebody in the Department who vouches for him, we do lend them for a time, subject to call for their return at any time.

The CHAIRMAN. Most of the patrons of the library are the several bureau chiefs?

Miss CLARK. Yes, sir.

The CHAIRMAN. What percentage of your library is held in their hands continuously? It was developed here during the hearings that they drew all the books they wanted and kept them right along, so as to save trouble in sending them backward and forward, so that I think perhaps there would be very little demand on your loan clerk.

Miss CLARK. I think 20,000 books and pamphlets.

The CHAIRMAN. Those are held by the bureau chiefs continuously?

Miss CLARK. Yes. Of course they are subject to recall all the time. Most of the periodical literature is kept in the library, and those volumes are called for. We borrow a great many volumes, of course, from the Library of Congress.

The CHAIRMAN. Of what character?

Miss CLARK. Scientific works, and very largely works of travel containing the work of naturalists—expensive works that we do not wish to purchase and which we can borrow.

Mr. SCOTT. Does your library contain any miscellaneous books—fiction, biography, and things of that sort?

Miss CLARK. I have just disposed of 117 volumes that have been in the library since its foundation, I think, and sent them to the Library of Congress, in accordance with the act passed a few years ago allowing us to send books that have no reference to our work to the Library of Congress for its own use, or to the Public Library here in the city.

Mr. SCOTT. So that your library is now purely a scientific library?

Miss CLARK. Yes; with some volumes of travel; but necessarily it is purely a scientific library.

Mr. HENRY. The books and pamphlets that are withdrawn for use in the several divisions are catalogued?

Miss CLARK. Yes, sir.

Mr. HENRY. How many books have you catalogued all together?

Miss CLARK. Ninety thousand, exclusive of the Government documents.

Mr. HENRY. And about 70,000 volumes are in your library and the other 20,000 volumes are outside?

Miss CLARK. Yes, sir. We could employ more people for making special lists and special catalogues for the use of the bureaus and divisions to great advantage. From time to time we have printed catalogues in book form on certain subjects. We have issued a catalogue of our periodicals, which is now exhausted. We have found it of great use, not only in our own department, but in libraries also throughout the country, to know what special scientific works we had in this library. We prepared a catalogue on forestry and irrigation and drainage, and we now have in preparation a catalogue of works on entomology in the Department library. Our collection of works on entomology is considered the second, perhaps, in the country—it is such a very valuable collection.

Mr. HENRY. Where is the first?

Miss CLARK. It is either in Philadelphia or at Cambridge.

Mr. HENRY. At Harvard?

Miss CLARK. Yes.

Mr. SCOTT. What occasion is there for traveling expenses?

Miss CLARK. For attendance on the American Library Association and other library associations, and attendance on auction sales at different cities.

The CHAIRMAN. Who decides upon what books you purchase?

Miss CLARK. A great many recommendations are sent in. We have recommendation order cards, which are distributed freely among the chiefs of divisions and bureaus, and they look over the scientific literature of interest to them. Often they see publications that I may not see, and they also recommend; and these recommendations are filed in my lists for ordering, and we go over them frequently. Of course I have to select, as I buy everything, and I select what seems to be needful at the time, within the means of the library.

The CHAIRMAN. Who is your messenger? I see you ask for an increase there.

Miss CLARK. That was a messenger who was formerly increased from \$600 to \$720.

The CHAIRMAN. From \$360 to \$480?

Miss CLARK. That is an additional messenger; that is the second messenger. We had one at \$720 for a number of years, and this is a younger messenger. It is very difficult for me to keep a messenger at this price. We have to keep changing. No sooner does a messenger learn where the books are than he obtains a transfer elsewhere.

The CHAIRMAN. What do you use a messenger for?

Miss CLARK. In the library, to pick up the books, to answer questions at the telephone, to respond to telephone requests for books, and

to send the books out to bureaus and divisions; also to distribute the periodicals—current periodicals that we send out.

The CHAIRMAN. Distribute them where?

Miss CLARK. To the various bureau and division libraries. For instance, the current numbers which are filed in these bureaus and divisions, coming in daily, are sent out by the messenger. He does various other errands of that sort. The other messenger is employed very largely in putting in book plates and book pockets and putting the labels on books and in preparing the books and pamphlets so as to be ready for the cataloguers to work with them.

The CHAIRMAN. Do you want, Mr. Scott, to ask any more questions as to the clerical force?

Mr. SCOTT. No, sir.

The CHAIRMAN. How many volumes do you have in the State library of Kansas, where you came from?

Mr. SCOTT. I have not looked that matter up recently, but at that time, I think, we had about 100,000 volumes.

The CHAIRMAN. You are a practical librarian, Miss Clark?

Miss CLARK. Yes, sir.

The CHAIRMAN. What would be the difference between the care of a library of this character and a university or State library of the same number of volumes?

Miss CLARK. While the work in the Department library seems to me in some respects like post-graduate work, of course the reference work would be of a much more difficult character than would be the work in a university library.

The CHAIRMAN. What do you mean by the reference work?

Miss CLARK. Well, the employees of the Department send in lists of subjects which they see notices or publications of, to be sent to them, and we have to do the best we can with our facilities, and we must know our books thoroughly in order to send them the books they want to carry on their investigations.

The CHAIRMAN. That would be more the duty of the head librarian or assistant librarian, but not of the ordinary personnel in the organization of the library, the ordinary clerks?

Miss CLARK. Well, some of our clerks are cataloguers, and the cataloguing in our library is a very difficult variety of cataloguing. Two-thirds of our publications are in foreign languages; we have a large proportion of our volumes in foreign languages, both our exchanges and our purchases, because the scientific work is done so largely in foreign languages. Then, again, the periodicals which we purchase are very largely in foreign languages.

Mr. BOWIE. So that you have not an exact standard of comparison with a university library?

Miss CLARK. I think not. A State university library has a good many publications that would not be found in our library, and a State university library is not of so high a grade.

The CHAIRMAN. I mean in the care of the library. We found that the expense of carrying on this library was far in excess of the State library of Kansas, with about the same number of volumes. I can see some reason for the larger purchasing sum, because these technical works and scientific books cost more money than the ordinary books.

Miss CLARK. I think the administration does not depend upon the

number of volumes so much as upon the quality of material. It is much more difficult to handle technical work, aside from the number of volumes. It is not the manual labor of putting the books on the shelves or handling them, but the treatment of materials that we have to do, and doing it to advantage.

Mr. SCOTT. Looking over these salary rolls, I should say the chief difference is in the salaries paid. For instance, we pay our librarian in Kansas \$1,000 a year instead of \$2,000. The cataloguers out there are paid \$500 and \$600 a year. They really start in at \$500 and work up to \$600, instead of starting in at \$1,000 or \$1,200, the salaries that are paid here. That is where the difference comes, I should say.

The CHAIRMAN. I thought it was also a good deal in the numbers, too.

Miss CLARK. I had occasion to compare salaries paid in our library with those paid in libraries that seemed to be more nearly like our library, especially in connection with the Keep commission.

For instance, in the John Crerar Library in Chicago, the State Library at Albany, N. Y., and the State Library at Harrisburg, Pa., in the matter of salaries, the higher positions were paid higher salaries, and the lower positions were paid lower salaries than in our library here; but the average was about the same. We found there was hardly a chief librarian in those institutions that received less than \$2,500 and \$3,000 a year. The John Crerar Library, I think, had a larger salary than that. I think the John Crerar Library would have one to compare with our library rather than the library of a State.

Mr. BOWIE. I suppose you stated, although I did not hear it, how many books and pamphlets you have in your library, inclusive with what is with the bureau chiefs?

Miss CLARK. Yes; 90,000.

Mr. BOWIE. About 20,000 of which are with the bureau chiefs?

Miss CLARK. Yes.

Mr. BOWIE. And the remainder you have physical charge of all the time?

Miss CLARK. Yes; I have charge of the others.

Mr. BOWIE. I understand you are responsible for and keep account of them all. Your responsibility is just as great for those that are in the hands of the bureau chiefs as for those that you have immediately under your charge?

Miss CLARK. Yes, sir; and we have all those books charged, as I say, on cards, so that we know in the main library every book that each man in each division is charged with. That is one of the duties of the clerk at the loan desk. We are obliged to do that because if a man severs his connection with the Department we must see that his account with the library is settled.

The CHAIRMAN. Suppose that a valuable book is lost, which was in the possession of a bureau chief; what is done?

Miss CLARK. He is obliged to replace the book or pay for it.

The CHAIRMAN. He is responsible for it while it is in his charge?

Miss CLARK. Not the bureau chief, but each Bureau that has any considerable number of books has some one in charge, and that person charges it to the individual, and he is responsible to the main library for that book.

The CHAIRMAN. So that, in a way, each of those bureau chiefs has a library?

Miss CLARK. There is some one in charge, if they have any considerable number of books.

The CHAIRMAN. How many books would each bureau chief average, would you say?

Miss CLARK. The Bureau of Forestry has a large number of books, and the Bureau of Chemistry has a large number of books. In the Bureau of Statistics I should think they would average—it is hard to average them, and there are only four that would have, perhaps, 2,500 or 3,000—but the Bureau of Statistics, I think, has more than that.

The CHAIRMAN. What scientific books would the Bureau of Statistics use?

Miss CLARK. Those are chiefly statistical books, the complete files of the boards of trade and statistical books of foreign countries.

The CHAIRMAN. Does the library now pay for any daily papers?

Miss CLARK. No, sir.

The CHAIRMAN. Now, coming to the lump sum for general expenses of the library, Miss Clark, I see you ask an increase there of \$2,000, practically.

Miss CLARK. Yes.

The CHAIRMAN. Is the committee to infer from that that there is that increase annually of scientific works?

Miss CLARK. We have not a complete library of all that has been published. We buy as fast as we can, but the Department work spreads out so much every year and new lines of work are taken up. We try to keep up with the publications along those new lines, as well as keep up with the old lines, and also in the matter of periodicals, which are the most important accessions of the Department, because they are up-to-date. Those are continually increasing every year. I think we added 175 new ones last year, besides keeping up with the old. I have to set aside about \$2,500 just for the purchase of periodicals.

The CHAIRMAN. Of this sum of \$8,000 that you had last year for the purchase of books and other things, how much was expended actually for the purchase of books? Do you recall?

Miss CLARK. Very nearly all of it, I should say. There was a little extra service. This year the whole appropriation was \$8,040, and I should say \$7,200 of that was certainly paid for books and nothing else.

The CHAIRMAN. Was the rest sufficient for the other items enumerated there—expenses incurred in completing imperfect series, binding periodicals, for the employment of additional assistance, and traveling, and library fixtures and shelving, and other materials? Have you any people under that class of "additional assistance?"

Miss CLARK. Not at present. I had some cards to distribute last spring and summer, and I employed some one for a month to help get those out of the way; and then I have an assistant, a sort of scientific assistant.

The CHAIRMAN. Then for traveling, did you use any considerable amount of that last year?

Miss CLARK. You mean this year; since the 1st of July?

The CHAIRMAN. The current fiscal year.

MISS CLARK. Nothing has been spent for that. I did not go to Oregon.

THE CHAIRMAN. Then for fixtures, shelving, and other material: that covers the rest of it?

MISS CLARK. Yes, sir. Fixtures were nothing this year.

THE CHAIRMAN. What does the sum amount to from the sale of card indexes? Does it amount to anything?

MISS CLARK. Not very much, because we send to the agricultural colleges and experiment stations three sets of those cards, and to the depository libraries. We send to the agricultural colleges and experiment stations the cards, free of charge, in exchange for publications we get from them, and also to the depository libraries, from whom we receive exchanges. Then any individuals or institutions who desire these cards subscribe for them. We have sent one set to Cambridge, England, to the professor of agriculture there, and then there are two or three individuals in this country who subscribe privately for them; but the income is very small.

I would like to say right here that it would be of advantage. I think, to have this printing put into the hands of the Librarian of Congress; that is, if he would do it. That is, we prepare the matter for printing, and he distributes it now, allowing free cards to agricultural college and experiment stations and compensating us for our service in preparing the cards. These cards are in very great demand in libraries, great and small, because they have at once the cards of our publications, and we have not been able to supply the demands of all who have applied for them. We have exhausted the editions that relate to the Yearbook, and the smaller libraries are quite desirous to have those, together with those covering the Farmers' Bulletins; and the Library of Congress could handle those cards in the matter of distribution and printing much better than we, as we are so crowded in the library for room for distribution and storage, and also our facilities are limited for this sort of mechanical work.

I think the Secretary desires that the library shall be moved into the first portion of the new building that is finished to such an extent that it will be safe to move into it. Our library is an unequalled collection, and, in many respects, it could not be duplicated.

THE CHAIRMAN. Does any other member of the committee desire to ask Miss Clark any further questions? Is there anything you would like to say on your own account, Miss Clark?

MISS CLARK. I would be glad if this increase should be allowed.

THE CHAIRMAN. I understood you to say there were three clerks now detailed from the Secretary's office to you, one of whom did not do practically any library work. That is as I understand you?

MISS CLARK. Yes, sir; and I would say that this clerk, who is a translator, is not really doing library work. She does translating. She translates nothing for the library, but translates for the Department.

THE CHAIRMAN. But there is no other bureau to which she could be practicably attached?

MISS CLARK. No; it is quite proper that she should be there; but it cuts down our roll for us in the library.

THE CHAIRMAN. Is she kept busy?

MISS CLARK. Yes. There are a great many letters to be translated, and she is busy on the average.

STATEMENT OF MR. A. C. TRUE, DIRECTOR OF EXPERIMENT STATIONS, DEPARTMENT OF AGRICULTURE.

Mr. TRUE. Might I be permitted to make a statement to illustrate one way in which the library is an unusually valuable library?

The CHAIRMAN. Yes.

Mr. TRUE. I suppose the Office of Experiment Stations has more dealings with the library, perhaps, than any other bureau in the Department, and it is essential to our work that the operations of the library should be kept thoroughly up to date and that every day in the year, because our work requires that we should promptly examine practically all the scientific material which comes into the library, in order to make the proper review of the literature in the Experiment Station Record. That means a kind of business in the library of the Department which I am sure goes on in comparatively few libraries in the country.

We get a large number of scientific publications and a very large number of periodical publications. We receive in exchange in the Office of Experiment Stations a considerable number of such publications, which are turned over to the library. We have to keep in closest touch with the library, and we ought to be sure that their work is fully up to date, so that there will be no delay in our review of the literature of agricultural science.

Miss CLARK. I will say that last year we purchased 529 publications—that is, up to date, and also I think it is safe to say we average three and a half. They are the most expensive of all publications. We received as a gift in exchange 3,290 different periodicals, just periodicals, making a total of nearly 4,000—

The CHAIRMAN. The periodicals are being bound?

Miss CLARK. Yes, sir; we bound about 2,000 volumes, so that the handling of all these periodicals requires a great deal of time and care in preparing for the bindery.

Mr. SCOTT. You include the periodicals in your correspondence?

Miss CLARK. Yes, sir.

The CHAIRMAN. The periodicals go to make up the total of the volumes?

Miss CLARK. When they are bound.

The CHAIRMAN. Not until they are bound?

Miss CLARK. No, sir. You can multiply this by perhaps an average of 4 to give the number. That is nearly 4,000 different periodicals received by purchase and exchange, and each one will average four in number, so that would make 16,000 separate numbers, and when they are in complete volumes we put them into our number in the library.

Mr. TRUE. In considering the work of the Office of Experiment Stations the other day we got as far as the irrigation item.

The CHAIRMAN. You want to address yourself particularly to the irrigation item in the bill?

Mr. TRUE. Yes, sir; the only other statement I would like to make is that since the last hearing at which I was present the House of Representatives has passed a bill increasing the appropriation to the experiment stations. If that bill is made a law it will considerably increase the general business of the Office of Experiment Stations, and therefore I think it is all the more necessary that the estimates made for our general work should be fully met.

Mr. SCOTT. Just why should that increase your work, Doctor?

Mr. TRUE. The authority given to the Secretary of Agriculture under that bill is more ample than that given under the Hatch Act.

The CHAIRMAN. It is claimed to be an exact copy of the Hatch Act. Mr. Adams has claimed that to the whole committee, that it was a verbatim copy.

Mr. TRUE. So far as the experimental work to be done is concerned it is that, but the wording of the act follows rather the so-called Morrill Act, which relates to agricultural colleges, and in its terms gives the Secretary of Agriculture exclusive authority to administer the law.

The CHAIRMAN. Have you had any conversation with Mr. Adams in regard to that point?

Mr. TRUE. Yes, sir.

The CHAIRMAN. Because he assured the committee—at least I so understood him—that it was absolutely a copy of the Hatch Act and simply provided for \$15,000 more appropriation under the terms of the Hatch Act, and he objected to any amendment being made in the committee on the ground that he did not want it changed in the least, because the Hatch Act was thoroughly construed and understood, and this simply meant the expenditure of \$15,000 more under the Hatch Act. Am I not right?

Mr. SCOTT. Certainly that was my understanding of it, except that the present appropriation will be \$5,000, and it will be ten years before it reaches \$15,000. That is the reason I asked you that, because it seems unreasonable to suppose that the work of your office would be increased by the mere addition of \$5,000 a year to the fund of the experiment stations.

The CHAIRMAN. Mr. Henry reminds me that Mr. Adams said that on the floor of the House.

Mr. TRUE. His statement is true in substance. That is, the experimental work under the Adams bill will be like that carried on under the Hatch Act, but under the terms of the Adams bill, as I understand the matter, an account will have to be kept of that fund.

Mr. SCOTT. Of this particular fund which the Adams bill carries?

Mr. TRUE. Yes, sir.

Mr. SCOTT. Separate and apart from the fund already under the Hatch Act?

Mr. TRUE. Yes, sir.

The CHAIRMAN. We do not know of that at all, Doctor. That is a new matter to us.

Mr. TRUE. That is a mere matter of detail.

The CHAIRMAN. We understand it thoroughly as merely an addition to the Hatch appropriation.

Mr. TRUE. It is essentially so.

The CHAIRMAN. By the way, before you drop that I would like to know next January the details of that expenditure so far as it concerns you, how much goes for increasing salaries and how much for experimental work.

Mr. TRUE. Yes, sir. Under the Hatch Act provision is made in some detail in one of the sections for the experimental work to be carried on. The Adams bill is drawn to provide expressly for original agricultural researches or experiments. The terms of the act in detail, with reference to the expenditure for buildings and the

rental of land, are somewhat different from those of the Hatch Act. There is no provision for printing in the Adams bill.

Mr. BOWIE. Is not the difference mainly that a very much more decided portion of this appropriation must go to experimental purposes than of the original Hatch appropriation?

Mr. TRUE. Yes; the Adams fund will be strictly for experimental purposes. It is a better bill in some respects. It is drawn more strictly.

Mr. BOWIE. And it gives greater power of supervision on the part of the Secretary of Agriculture?

Mr. TRUE. There is no question about that.

The CHAIRMAN. This bill provides especially that the additional amount appropriated shall be expended in the work of experimentation only.

Mr. TRUE. That is true.

The CHAIRMAN. Except that 5 per cent of it may be expended for the construction of buildings?

Mr. TRUE. Yes, sir.

Mr. BOWIE. I have said all the time that the Adams bill appropriated a very much larger amount of the fund to experimental purposes than was appropriated under the original Hatch Act. I have understood it all the time, and I should not regard it as necessarily a misstatement to say that the bill gives additional power of supervision of the Secretary of Agriculture and has greater limitations.

The CHAIRMAN. I think you misunderstand it. We understood that it was absolutely expended practically under the terms of the Hatch Act, and it was simply making an expenditure of \$20,000 a year instead of \$15,000.

Mr. TRUE. Our work connected with the Adams fund will not be a large matter, but it will be an item in our business.

Mr. LAMB. What point do you make on that?

Mr. TRUE. Simply that it is to be taken into account in the estimates. I am not asking for any additional money.

Mr. BOWIE. I think under the original Hatch Act one-half went to salaries—just using an arbitrary figure—and one-half to actual experimental work, and if under the Adams bill 95 per cent must go to experimental work and only 5 per cent to other items of course you are bound to keep your accounts of the two funds separate in order to show that the provision of each act has been complied with.

Mr. TRUE. That is why I speak of this.

The CHAIRMAN. My point would be that that would not be necessary. I thought that they were all merged.

Mr. LAMB. There is no specific requirement for them to be kept separate, that I can see.

The CHAIRMAN. No.

Mr. BOWIE. It would not be a specific requirement, but it is an absolute necessity, if a different proportion is required to be spent for experimental purposes under one from what is required to be spent under the other bill. You would have to do it. It would follow as an absolutely necessary incident of the situation.

Mr. TRUE. Yes, sir; we shall have to certify to Congress that the provisions of both of those acts have been carried out.

The CHAIRMAN. The character of work contemplated by the Adams bill is exactly the character of work that is being carried on now

under the Hatch Act. This simply makes an increase of that kind of work.

Mr. TRUE. That is true.

The CHAIRMAN. That is all there is of it.

Mr. SCOTT. I think when you come to put this act into effect you will find you will not exhaust a quarter of a bottle of ink in additional clerical work.

Mr. TRUE. It may be so.

Mr. LAMB. He is not asking for anything in addition.

Mr. TRUE. I am not asking for any money. It is not a matter of great importance, but is one of the items in our business.

Mr. BOWIE. How would you know that 5 per cent of this is used for buildings?

Mr. SCOTT. There is no requirement that 5 per cent or any other per cent shall be so used.

Mr. BOWIE. In the Adams bill?

Mr. SCOTT. There is a limit in the Adams bill on what can be expended for other than experimental purposes.

Mr. TRUE. Five per cent for buildings or for land.

The CHAIRMAN. Mr. Adams said he wanted it to conform exactly to the Hatch Act. I made the point that they ought to build their own buildings, they being a part of the real estate.

Now, suppose we get right down to the irrigation item. Go on, Doctor, and tell us what you want to do and why this increase is made.

Mr. TRUE. The authority given us by Congress last session has proved ample for the purposes of our investigations in rural engineering, and we are not asking now for any extension of our powers. We are simply asking that the title of this division of our work shall be changed to "Rural engineering," since we think the present title is in a measure erroneous and misleading—that is, we are constantly spoken of in various ways as the "irrigation investigations," and sometimes we are mixed up with the work that is being done by the so-called Reclamation Service and by the agricultural experiment stations. The term "irrigation" is in some respects a broad and indefinite term, and some things that are being done in other bureaus at the Department would have relation to irrigation, broadly considered. So that in various ways it seems to me it would be better to limit this title to "Rural engineering," within which domain our operations are intended to be quite strictly confined. We also ask permission to spend a small amount for the rental of proper quarters for our force, since the Department buildings, as you know, are overcrowded, and the words "rental of buildings" have been inserted in the Book of Estimates.

The main question before us, however, relates to the amount of money which we can judiciously and economically apply to this enterprise during the coming fiscal year. Our estimates were carefully made to provide for the work in progress, which ought not to be discontinued, and also for a few new pieces of work which in September last it seemed desirable we should undertake in response to urgent demands. These estimates, as presented to the Secretary, amounted to \$92,750. At that time our work on farm machinery

was just beginning, the special officer in charge of this work having been in our service less than three months.

The CHAIRMAN. How does that farm machinery come under irrigation?

Mr. TRUE. It comes under the provisions of this item.

The CHAIRMAN. I thought we guarded against that.

Mr. TRUE. I will explain briefly how that is. The Secretary was not sure that we were prepared to extend our work in that line and reduced our estimate to \$82,500. Now, this provides, so far as the farm-machinery work is concerned, for the salary and expenses of one expert to answer the inquiries that come to the Department and to conduct a few experiments in pumping, and with one or two implements, in immediate connection with our irrigation experiments.

The CHAIRMAN. Show me right there in that paragraph where the Department has power to make any investigations with regard to agricultural implements.

Mr. TRUE. About 10 lines down in that item in the Book of Estimates we have this language:

And upon the use of different kinds of power; and appliances for irrigation, drainage, and other agricultural purposes.

The CHAIRMAN. "Other agricultural purposes?"

Mr. SCOTT. "Power and appliances."

The CHAIRMAN. That applies to drainage. "Other agricultural purposes." That opens the door—wide open. We thought we had closed that, but we did not.

Mr. TRUE. Since our estimates were made the farm-machinery work has taken more definite form, and demands have come to us from manufacturers of farm machinery, as well as from the agricultural colleges, which would make it necessary, if we are to comply in any reasonable way with such demands, that our estimates should be increased, at least to the original amount.

Mr. SCOTT. What would you do in that direction if you should get the amount you ask for? I mean in the direction of working out the machinery problems.

Mr. TRUE. We would take up especially two lines of work. One is a study with reference to the use of alcohol as compared with gasoline as a means of creating power for farm work. That is a subject that is now attracting a great deal of attention and is becoming one of very considerable importance to the farmers, as well as to other persons using power.

The CHAIRMAN. Has not that work already been done? I know that hearings are in progress now and have been for two or three years at different intervals before the Ways and Means Committee on a bill introduced to remit the internal revenue on denatured alcohol, and the argument made for it is that it has been fully demonstrated that the use of alcohol will result in much more economical power than can be produced with oil or any product of oil. What is the use of the Department taking up that investigation?

Mr. TRUE. It is true that in some foreign countries, and especially in Germany, alcohol is already used to a considerable extent for power, but there are still numerous unsolved problems with reference to its application to practical use in connection with farm machinery.

Mr. SCOTT. Do you not think there are a whole lot of other problems that are much further from being solved than this one is upon which the money might more judiciously be expended?

Mr. TRUE. There are certainly a large number of subjects upon which we might work.

Mr. SCOTT. In other words, it seems to me to be a rank waste of money to spend it in a refinement of experimentation upon a subject which, as a general proposition, is already thoroughly demonstrated, as long as there is a great ocean of unexplored knowledge that the Department might investigate.

Mr. LAMB. I understand that Edison is going to get out something before long that will make all these other methods of power of no use at all.

Mr. TRUE. The reason for taking this up at this time is that it seems to be a subject that is up for consideration, and we do not feel at present that we can speak authoritatively with reference to this matter as it relates to practice in this country.

Mr. SCOTT. Have you had any suggestion that you investigate gasoline as a power fuel?

Mr. TRUE. The investigation to which I have referred would necessarily involve a comparison of gasoline with alcohol.

Mr. SCOTT. Is not the use of alcohol practically as well understood as that of gasoline?

Mr. TRUE. I do not think so. But that is only one line of work.

Mr. SCOTT. Yes. I would like to hear some others.

Mr. TRUE. The other, in general, relates to the use of implements used in agriculture in the semiarid regions. As far as I have examined into the matter, it seems clear that the implements at present in use can be improved with reference to special use in that region, and we desire to make a study of that matter in connection with the work that we are carrying on in irrigation.

Mr. SCOTT. Would you expect to make this improvement by employing inventors and sending them out there and having them endeavor to devise a machine that would do better for a given purpose than any existing machine does?

Mr. TRUE. Our present purpose is to establish tests of certain of those machines, say drills, under the immediate supervision of the expert whom we have employed, Mr. Zintheo.

The CHAIRMAN. Where does he come from? Where was he educated along these lines?

Mr. TRUE. He has in other years been associated with farm-machinery manufacturers, and thus gained an expert knowledge on this subject. He was then employed by the agricultural college in North Dakota, where he taught farm mechanics and made some simple experiments with machines. He was so successful there that he was taken by the Iowa agricultural college as professor of farm mechanics. But our work was more attractive to him, as he desired to extend his work in the line of experimentation, and so we were able to get him.

The CHAIRMAN. Now, to bring that right down to a practical example. You say some experiments in drills. How is he going to decide between three or four drills as to which is the best one?

Mr. TRUE. He will, as I understand it, get together drills which represent the different types.

The CHAIRMAN. Each manufacturer as a rule has a type of his own.

Mr. TRUE. I do not understand that that is so.

The CHAIRMAN. Pretty nearly so, is it not? There are no two drills exactly alike.

Mr. TRUE. Not exactly alike, perhaps, but so nearly alike that we may classify them under types. I think there is no difficulty about that. We will take these drills and determine as definitely as we can what they will do. Along with that—

The CHAIRMAN. Right there, how are you going to determine what those will do?

Mr. TRUE. We have apparatus for determining the draft, and experts observing these machines can report on them in different particulars.

The CHAIRMAN. How can you determine that unless you see the machines work in different kinds of soil and differently prepared soil?

Mr. TRUE. All we can do, and that is our purpose now, is to begin with definite experiments with these machines in one or two places.

The CHAIRMAN. In the way of field experiments?

Mr. TRUE. Yes, sir; in the way of field experiments.

The CHAIRMAN. Do you propose to buy the drills or to ask the manufacturers to furnish them?

Mr. TRUE. Either buy them or take them under suitable guaranties from the manufacturers.

The CHAIRMAN. Suppose they will not furnish them?

Mr. TRUE. I think they will.

The CHAIRMAN. Suppose they will not?

Mr. TRUE. Our experience is that they will.

The CHAIRMAN. Do you suppose that the average manufacturer is going to furnish you a drill when the Government is going to pass a judgment on his drill and perhaps ruin his business along that line?

Mr. TRUE. I can only judge from what has been done in other lines of this work. For instance, the experiment stations have made quite thorough tests with separators, and there has been no difficulty to get the manufacturers of the different kinds of separators to bring them to the station and put them at the disposal of the station for tests, and the results of these tests have been published.

Mr. HENRY. They have been published?

Mr. TRUE. Yes, sir. Now, the stations are careful, and so we would be careful, to report on types of machines rather than on particular machines.

The CHAIRMAN. How are you going to indicate the type to a farmer?

Mr. TRUE. I do not think there is any practical difficulty in that. At least that has been the experience of the stations as far as they have gone.

The CHAIRMAN. You know how I feel about this, and I just want to know exactly how you are coming out on this problem as near as I may.

Mr. TRUE. Of course we have been surprised to find out how desirous the manufacturers are that we should do this work, and they look at it in this way, so far as I am able to ascertain. They say, "Thus far our machines have been made on a commercial basis—that

is, we have endeavored to get a good machine to sell. The farmers do not understand the principles on which these machines are made, and they do not have information regarding what they will do, so that in very many cases they purchase machines which are not adapted to their work, and the result is that our business is injured because of dissatisfaction growing out of such things.

"If the Government comes in and makes definite experiments, the results of which are published, then both the manufacturer and the farmer will have something substantial on which to go, and it will not be difficult for the manufacturer to adapt his machines to the plans that are found to be desirable through such investigations."

Mr. SCOTT. Have reports been published of work done of this sort by the experiment stations?

Mr. TRUE. Yes, sir; that is, reports relating to separators.

Mr. SCOTT. Relating to what?

Mr. TRUE. Separators.

Mr. SCOTT. They have been published?

Mr. TRUE. A number of bulletins have been published on that subject.

Mr. SCOTT. Do you know whether it has resulted in a modification of any machines by any manufacturer?

Mr. TRUE. Yes, sir; I understand that it has.

The CHAIRMAN. Most of these machines are made under patents—under patent rights—and you can not infringe on them.

Mr. SCOTT. I know; and that is the reason I was asking—

Mr. HENRY. I would like to ask a question. The separators have been before the public, I think, for quite twenty years?

Mr. TRUE. Yes, sir.

Mr. HENRY. They manufacture those separators under different patents, but they are all good. They are like half a dozen different makes of mowing machines—they are all good. They have been exhibited at State and county fairs and investigated by practical dairy-men, and what is there left for the experiment stations to do with a proposition that the dairy public are supposed to be thoroughly advised about already?

Mr. TRUE. The stations, as I said, study these machines with reference to their exact operation. It may be true that several machines are good, as far as they go, but that one machine is adapted to one purpose better than another.

Mr. HENRY. But they are all for the same purpose—for separating milk from cream.

Mr. TRUE. Yes, sir; but I think you will find, if you will look into this matter, that changes have been made in comparatively recent years in details to make these separators conform more definitely to a certain limited number of types.

Mr. HENRY. There have been improvements made time after time, and always will be.

Mr. TRUE. Some of these things have been the outcome of these investigations by the stations.

Mr. HENRY. You take one creamery manager and he is tied up to the White Mountain separator, and he will advise all his patrons to use that separator. Another manager will advise his patrons to use the separator that he uses.

Mr. TRUE. I think you will find it true in regard to these investigations that they will not injure the manufacturers by picking out individual machines to be discriminated against.

Mr. HENRY. But I can not see a field for your work in a machine that has been developed and practically perfected. I do not see a field for any experimental work there. It is owing to my ignorance, Doctor, undoubtedly, but I am looking for information.

The CHAIRMAN. You have practiced farming for a good many years, Mr. Henry?

Mr. HENRY. I have had some ideas about separators, but half a dozen makes are all very good.

Mr. TRUE. In the case of separators, I take it that the work is done. We are not proposing to take those up. But I am sure, so far as I can make out from my studies in this matter, that there is a field for us in machinery for use in the semiarid region.

The CHAIRMAN. The separator is a separator whether it is in the arid regions or not. Whether the wheat is grown in the arid regions or not, it is wheat all the same.

Mr. SCOTT. One of you is talking about a milk separator and the other about a grain separator.

The CHAIRMAN. Why, I thought you were talking about a grain separator.

Mr. TRUE. No, sir; about a milk separator.

The CHAIRMAN. Well, my remarks might apply to that just as well as to the grain separator. A milk separator is used for the same purpose, whether in a semiarid region or any other region.

Mr. HENRY. I understood Doctor True to refer to a milk separator.

Mr. TRUE. That is what I meant.

The CHAIRMAN. I thought you were referring to thrashing machines.

Mr. TRUE. I beg your pardon for not being more exact.

Mr. BROOKS. I want to ask Mr. True one or two questions, if I may, to clear up one matter that I am interested in.

The CHAIRMAN. Along this line?

Mr. BROOKS. Yes, sir.

The CHAIRMAN. Certainly.

Mr. BROOKS. I wanted to know whether this increase you ask for of \$8,320 in any way covers the field, or in any way is to duplicate the work on which we had the hearing the other day, when Mr. Mead was present and Mr. Mondell was here, upon the work in the semiarid regions? In other words, I understand that that is not covered by the \$8,320 that you ask for here—those special bills.

Mr. TRUE. You are right about that; and I was about to speak of that.

Mr. BROOKS. And then one other question, if I may ask you this, because I have an appointment and must leave in a few minutes.

As I understand it, other than the farm machinery part which you have just been discussing, the substance of this \$8,320 increase is along the line of your drainage investigations and the adaptation of your drainage investigations, which is not arid work at all, and following out the previous work you have done in the arid-land work?

Mr. TRUE. Yes, sir.

Mr. BROOKS. So that the increase which is asked for here does not answer the needs, or the supposed needs, of the gentlemen who had the special bills before this committee?

Mr. TRUE. No, sir.

The CHAIRMAN. That is what you wanted brought out?

Mr. BROOKS. Yes, sir.

Mr. TRUE. I intended to make that very clear.

Mr. SCOTT. You have developed the fact that this work sought to be done by your special bill will not be covered by this appropriation. so that when we come to consider Mr. Mondell's bill it will be considered on its merits, outside of this appropriation.

Mr. BROOKS. I think that is all that I care to say except that I hope that Doctor True will make the importance of the work in the arid regions as apparent as possible.

Mr. TRUE. Since these estimates were made an entirely new demand has come up for the continuance of our investigations in the semiarid regions. This is embodied in four separate bills, which I am informed have already been considered by your committee.

These call for experiments to determine how the small supplies of water in different parts of the great semiarid region can be utilized to supplement what is commonly called "dry farming," so that whenever droughts come the settlers in those regions may be able to maintain permanent and attractive homes. This, in my judgment, is a very important matter, since the recent favorable seasons and the success of experiments in dry farming conducted by the Department of Agriculture and the State experiment stations have already brought many settlers into this region, and many more are preparing to come. I know this from my own personal observations, since I have been twice across the continent within the past year, and it is wonderful how this dry farming has spread outside of the irrigated regions.

Past experience indicates that dry seasons are sure to come, and then it is feared that unless irrigation can be had, at least to a limited degree, many of these people will have to abandon their homes, as thousands have been compelled to do in comparatively recent times.

I am informed that, owing to the broad phraseology of the bills covering this subject which have recently been before your committee, there has been some fear of duplication of work, or of conflict between the Office of Experiment Stations and the Bureau of Plant Industry on this matter. I am glad to say that as regards our respective lines of work Doctor Galloway and myself have a good understanding and are prepared to avoid duplication or conflict.

It is not the intention of the Office of Experiment Stations to engage at all in what is ordinarily called dry farming. That belongs to the Bureau of Plant Industry, whose work includes all matters relating to varieties of crops and methods of cultivation. The Office of Experiment Stations, through its division of rural engineering, will deal exclusively with experimental work in irrigation, drainage, pumping, and farm machinery. Of course on tracts where we are testing methods of irrigation we shall grow crops, but they will be ordinary crops of the region or those which we are advised to grow by the Bureau of Plant Industry. We shall not make crop experiments. The respective lines of work of these two Bureaus are clearly differentiated.

The difficulty has arisen from the broad phraseology of the bills

before your committee, which undoubtedly covers the field of both Bureaus.

(Informal conversation followed. The stenographer was requested not to write.)

What it needs is money. When you have decided what more you will appropriate for the object of these bills, give Doctor Galloway his share for the dry-farming experiments and give me my share for Mr. Mead's work in irrigation in the semiarid region. What Mr. Mead and myself have concluded we can utilize to advantage in this work during the next fiscal year, to meet in a reasonable and effective way the demands indicated in the bills before your committee, is \$20,000 in addition to our original estimate of \$92,000. This \$20,000 will enable us to establish four or five stations for experiments limited to irrigation in the semiarid region. These stations will be established in typical regions from north to south through the semiarid belt.

The proposition which we make, therefore, is this: Grant the Office of Experiment Stations \$82,750 for its general work in rural engineering, which will be prosecuted East and West, North and South, in over 30 States and Territories; \$10,000 for special experiments on power and machinery for farm use, and \$20,000 for limited irrigation experiments in the semiarid region; in all, \$112,750. Do this by increasing the amount in this item of the bill, but without changing its phraseology.

Mr. Mead had expected to appear before the committee to answer any questions in detail, but he can not be here this morning. I think in a hearing which was held with reference to these special bills Mr. Mead covered very well the ground of our work except that which relates to drainage. I have brought with me our Mr. Elliott, who is in charge especially of drainage work. He can answer in detail questions with reference to that, and I will try to do the best I can to answer any other questions which the committee may wish to ask.

The CHAIRMAN. What problems in the agricultural irrigation will arise under those experiments that you propose to make that do not arise already in these general investigations of the agricultural irrigation that you are carrying on now? I use the term "agricultural irrigation." I know what I mean myself, exactly, but I do not know whether you do. I mean just as water is applied to the growing crops and the raising of water. What new problem is there in that? Is not that covered in that general appropriation? This is simply coupling dry and irrigated farming together, is it not? You can have a dry patch for your cattle and irrigate a small patch alongside of it for a garden.

Mr. TRUE. In semiarid regions there are many districts where it has not been determined how far a limited amount of irrigation, which would irrigate, say, from 5 to 20 acres of land in connection with a homestead or ranch, can be economically worked out.

The CHAIRMAN. Does not that come right under that general problem that is to be solved by this item, without necessarily making it separate from dry farming?

Mr. TRUE. The phraseology of our item covers all this work; but demands have come, as are represented by these bills, for more work along this special line than it would be possible for us to undertake with the amount in our estimates.

Mr. SCOTT. Have you at hand a statement which would show us about how this fund was divided last year—how much of it was spent for what might properly be called irrigation experiments and what for drainage?

Mr. TRUE. I doubt whether I have a statement which shows exactly that. It is possible that Mr. Elliott can state in a general way how much was spent for drainage last year.

Mr. ELLIOTT. I can only give a general statement in regard to that. I think about \$15,000 would cover all that was expended.

Mr. SCOTT. Unless you have that right there it is not worth while to go over the matter. I asked that question to bring out this information. The point I had in my question was this: I wanted to ascertain if possible whether certain work which you had been doing last year had not reached a stage where it could be dropped or where it could be shaded in and continued on into exactly the same kind of experiments in dry farming that these bills ask for, along the line of the questions asked by the chairman.

Mr. TRUE. We do not consider that feasible. That would mean the abandoning of important drainage investigations which have not reached the point where they ought to be stopped.

Mr. SCOTT. You have not made any experiments at all as yet in dry farming, as contemplated by these bills?

The CHAIRMAN. They call it dry farming. It is not dry farming. It is a combination of dry farming and irrigation.

Mr. SCOTT. I understand that. I was using that phrase as a common phrase by which they designate these bills and this kind of work.

Mr. TRUE. We have done a little of that work, and our estimate as made originally would include a little of that work.

The CHAIRMAN. How long have these appropriations been going on?

Mr. TRUE. Eight or nine years.

The CHAIRMAN. Tell the committee what absolute agricultural problems have been settled on this irrigation problem. I know that is a pretty broad question, but in a general way tell us what absolute problems you have done away with and settled and are no longer studying.

Mr. TRUE. These are some of the results of the irrigation investigations: First, the determination of the amount of water used in this country to irrigate an acre. This work was carried on at the outset of our investigations and continued during four years. During that time we have obtained data which give authoritative and safe averages as a working basis for engineers, courts, water officials, and farmers. These reports are now being used by the Reclamation Service in settling on the projects for the reclamation of land and for the construction of the works. That has never been done before.

The CHAIRMAN. If you settle that, why does it not settle it for the small farmer who proposes to irrigate a small portion of his land and dry farm the rest of it?

Mr. TRUE. That was the determination of the practice in this country, but that investigation brought out the fact that that practice might be improved.

The CHAIRMAN. Yes; but you say it is used as a basis in this way.

Mr. TRUE. It is used because that is all we have.

The CHAIRMAN. That is not completed, is it?

Mr. TRUE. We have found out what the practice is at present. That we are through with. It took us four years to cover the irrigated regions. Now we are going on with investigations to determine what changes should be made in that practice to better utilize the water supplies available.

Mr. SCOTT. And in order to reach any practical results along that line do you not have to experiment with each individual farm where irrigation is used?

Mr. TRUE. There is a sense in which that is true, just as it is true with all agricultural investigations. We can never, by all the work that the Department and the experiment stations are doing, establish definite rules for farming; but in the ordinary sense in which we speak about agricultural investigations there is great advantage in determining what can be done in different agricultural regions, and that is all that we in any case should attempt to do. Our investigations have also shown quite definitely the cost of preparing land for irrigation in different regions, and in this way exact data have been obtained which are very useful guides to settlers and investors in the irrigated region.

The CHAIRMAN. That would apply distinctly to the experiments that these bills contemplate, would it not? The cost would be a pretty material subject to be considered by these settlers?

Mr. TRUE. Yes, sir.

The CHAIRMAN. Do you consider that would be settled? You have ascertained the cost per acre of fitting the land for irrigation, so that you can tell these men who propose to go on and undertake this combination of dry and wet farming the cost per acre of fitting the acres proposed for irrigating?

Mr. TRUE. That we have determined in a general way for the irrigated region.

The CHAIRMAN. I say you have determined that?

Mr. TRUE. Yes, sir. Then we have made pumping investigations in the rice districts, which have shown that the efficiency of pumps ranges all the way from 5 to 85 per cent, and we have also made some pumping investigations in California with reference to pumping for irrigation, where the efficiency ranged from 35 to 70 per cent.

The CHAIRMAN. What have you ascertained by that investigation, definitely?

Mr. TRUE. The importance of that is this: Take the rice districts, for instance. One-fourth of the expense of the crop is in the pumping. Before our investigations were made the planters had no definite means of determining such matters and were using pumps somewhat indiscriminately. As the result of such investigations they are taking pains to inquire with reference to the types of pumps and studying their performance very carefully with reference to getting the most out of them. So that I am sure that great good has come from such work.

In the earlier years of this work we paid much attention to questions relating to water rights and the principles which should govern the distribution of water, and our reports on that subject are now considered standard authorities, and they have had much to do with the irrigation legislation which has been enacted in the different States since that time. Those are some of the ways in which we have achieved results during the past eight years.

Mr. SCOTT. I want to ask just one more question of Doctor True. This goes to the title which you propose to give to this office. Is "rural engineering," as technically construed, a sufficiently wide title for the work you propose to do here?

Mr. TRUE. Yes, sir.

The CHAIRMAN. Is it only applicable to irrigation?

Mr. TRUE. No, sir; it would be applicable to drainage and whatever work we are doing under the terms of this item.

The CHAIRMAN. Rural engineering?

Mr. TRUE. Yes, sir.

The CHAIRMAN. The layman would not understand that rural engineering had anything to do with irrigation, I should think.

Mr. SCOTT. Why would not that title apply just as well to road building, for instance?

Mr. TRUE. It would, but that is specifically set apart in another item.

Mr. SCOTT. Yes; but is it wise for you to adopt a title here that in the minds of outsiders would confuse the work you are trying to do under this paragraph with that which is done under an entirely different officer?

Mr. TRUE. It would not seem to me that any confusion would arise. The work of the roads office is specifically set forth in its title at present. Nobody makes any mistake about that.

Mr. SCOTT. How could anybody make any mistake if you allowed this title to remain as it is, "Irrigation and drainage investigation?" You may have to use a sentence or two once in a while to explain that you are not doing here any of the work that the reclamation fund is especially set apart to do, but that is the utmost, it seems to me, in the way of explanation that would be necessary. Irrigation and drainage investigation is precisely what you are doing.

Mr. TRUE. But, as I have stated before, we have found that confusion does arise in the public mind with reference to our work as compared with the reclamation work, because both are called irrigation work, and in the correspondence in our office and in conversations which we have with people when we meet them about the country it is shown that there is that confusion.

The CHAIRMAN. I would suggest they ought to change their title, because you were in this work before they were.

Mr. SCOTT. On the other hand, if you adopt the title "Rural engineering," may you not have to make an elaborate explanation of it to every layman you meet in order to give him any kind of an idea of what you are doing? It seems to me that irrigation is the last thing the ordinary man would think of under the head of "Rural engineering."

Mr. TRUE. We may have to make the explanation, but the trouble now is that we can not explain it. People are still confused.

STATEMENT OF MR. C. G. ELLIOTT.

Mr. SCOTT. There are two points that I would like to ask you a few questions on. I believe you did state that you spent last year about \$8,000 in the drainage investigation.

Mr. ELLIOTT. No, sir; I estimated \$15,000.

Mr. SCOTT. What projects was that money spent on?

Mr. ELLIOTT. This last year we had two large projects. One was a project of making a drainage survey in Red River—the valley counties of North Dakota. In conjunction with the county boards, who put up a half of the estimated expense, we made those surveys, and are now developing plans for a comprehensive drainage of those flat lands in order that the counties may unite upon some plan which they can prosecute under the State law, by dividing the land into districts and to so apportion the expense in each case that they can execute the work.

The CHAIRMAN. This is a new thing to me entirely.

Mr. SCOTT. Now, what is your other project?

Mr. ELLIOTT. One other was in Utah, experimenting with the drainage of seeped or swamp lands in the irrigated regions of that State.

Mr. SCOTT. That is, where it has been carried on for a number of years?

Mr. ELLIOTT. Yes, sir.

Mr. SCOTT. Can you tell me how nearly you have completed this Dakota project? How much money will you probably have to spend in order to carry on the work to its completion?

Mr. ELLIOTT. It has been completed except the finishing of the maps and estimates.

Mr. SCOTT. It is an insignificant matter, then?

Mr. ELLIOTT. Yes, sir.

Mr. SCOTT. And how much will you have to spend in order to accomplish results in the Utah project?

Mr. ELLIOTT. We work there in cooperation with the State. The State made an appropriation for irrigation and drainage investigation. The sum was \$10,000 for the two years; \$4,000 of that was set aside for drainage and \$6,000 for irrigation experiments. We began the drainage work last year, and that is largely experimental. We obtain assistance from the farmers and counties where it is possible, so as to make the appropriation go as far as possible. We then take charge of the plans and the construction of such works, and obtain a lease in which we will have control of the work for three years and make observations and report results.

Mr. SCOTT. How much do you estimate you will have to spend, then, on that this next year?

Mr. ELLIOTT. There is \$4,000 set aside on that—\$2,000 from this Department and \$2,000 from the State.

Mr. SCOTT. Your Department, then, will spend \$2,000 on that project?

Mr. ELLIOTT. Yes, sir.

The CHAIRMAN. That is actual drainage?

Mr. ELLIOTT. Yes, sir; experimental drainage, usually in those cases about 40 acres or more, which is actually drained on some owner's property.

The CHAIRMAN. Who gets the benefit of it if it is successful.

Mr. ELLIOTT. Yes, sir.

The CHAIRMAN. Without cost?

Mr. ELLIOTT. Yes, sir.

Mr. SCOTT. I take it that you have spent on this Dakota project something like \$12,000 or \$13,000 during the past year?

Mr. ELLIOTT. No, sir.

Mr. SCOTT. I judged that because you estimated \$2,000 as the cost of the Utah project, and altogether you had spent \$15,000, and you said there were only the two projects.

Mr. TRUE. The only two large projects.

Mr. ELLIOTT. These are two leading projects.

Mr. TRUE. These are the two most important pieces of work. There are other phases of the work.

Mr. SCOTT. Can you give me an idea of how much the Dakota project did cost?

Mr. ELLIOTT. The Dakota project has cost already only \$2,000, to this Department.

Mr. SCOTT. Then what are some of these smaller projects to which Doctor True refers?

Mr. ELLIOTT. We have been investigating the drainage of the Kankakee marsh, in Indiana, where there are a great many districts organized, but where there is no general plan made for the disposition of the water, and the different organizations are conflicting with one another and following no general plan. We are getting together reports of all the work that has been done, for the purpose of proposing a plan and getting the people to unite together in one system, to avoid litigation and also for the purpose of perfecting the methods of drainage.

The CHAIRMAN. That is all owned by the State of Indiana, is it not?

Mr. ELLIOTT. Most of it is in Indiana. Part of it is in Illinois.

The CHAIRMAN. The northern end of it is in Illinois?

Mr. ELLIOTT. The western end. It extends from Momence, Ill., to South Bend, Ind.

The CHAIRMAN. Yes.

Mr. SCOTT. Can you give us an idea of how much you will have to spend on that the coming year?

Mr. ELLIOTT. It will require about \$2,000 this coming year.

Mr. SCOTT. Can you mention any other project?

Mr. ELLIOTT. We have also been investigating the tidal coast lands of South Carolina with reference to benefiting the rice-growing industry. There was serious trouble there. The water is deficient in some of the rivers, and the rice fields have been abandoned. We wanted to find first whether that quantity of water could be increased, so as to restore the rice-growing industry, and if not, how those fertile lands could be drained for the production of dry-land crops. We have had a man there.

The CHAIRMAN. Would that come under your province of irrigation, where you are developing the land for dry crops?

Mr. ELLIOTT. Drainage of wet lands for dry crops.

The CHAIRMAN. Is not that a matter absolutely for the States and localities, too? We have a locality in New York where the operation is conducted by the State engineer. There is an area to be drained, and they sent a petition to the State engineer asking that a survey of that be made and an estimate of the cost be made and that the cost be assessed pro rata among the owners. You are going into the States and doing work for the private owners; that is the result?

Mr. ELLIOTT. No; they do not know what can be done. They have no drainage law. They do not know what they want. They do not know what can be done with those lands. They do not know what

it will cost to improve them, and the lands are going down and becoming ruined, and now they appeal to us and want to know, "What can you do to help us? What plans can you propose? What is the best method to restore these lands or make them productive?"

(Informal conversation followed. The reporter was requested not to write.)

Mr. SCOTT. I think I understand the distinction.

The CHAIRMAN. The result is the same. There may be a distinction.

Mr. SCOTT. To a limited extent it may be. But I do not understand, for instance, that in this Indiana project the Department proposes to go there and actually drain that land as that little organization of farmers in New York drains that land there. What they propose is to show them how the land can be drained. They want to make an organization, as I understand, to frame a law under which the work can be done and they will do the work.

The CHAIRMAN. The point I make is that the States ought to do this work themselves. They have an experiment station in each of the States.

Mr. SCOTT. In the South Carolina project, how much money will you spend on that?

Mr. ELLIOTT. We shall spend at least \$2,500 in completing that work, I think.

The CHAIRMAN. What is the nature of that work? Are you actually doing that work—

Mr. ELLIOTT. No, sir; we are finding out what should be done and what those people should do.

The CHAIRMAN. How are you finding that out practically?

Mr. ELLIOTT. We are making examinations and making surveys.

The CHAIRMAN. Are you doing the actual work of draining?

Mr. ELLIOTT. No, sir; we are making surveys, preliminary to such drainage, in order to determine whether we may be able to recommend a plan which is feasible and profitable to those people.

The CHAIRMAN. Whose property did you go on to make that survey—private property?

Mr. ELLIOTT. It is all private property; certainly.

The CHAIRMAN. Who will get the benefit of that survey in the end—the owner?

Mr. ELLIOTT. Where it happens to go on some particular owner.

The CHAIRMAN. It must go on some particular owner. You can not avoid it. It must go on some particular owner.

Mr. ELLIOTT. That is an incidental benefit to the owner, but the work is for the benefit of the entire community. It is a general proposition.

The CHAIRMAN. That may be so. I just want to show the facts about it.

Mr. SCOTT. Have you any of these projects that are not finished?

Mr. ELLIOTT. We have begun work to determine what drainage should be taken up in southwestern Texas at a place called Brownsville, where the land has become very salty and there seems to be common salt in the soil. When they began irrigation they developed the salt and killed the crop. We want to find some method of drainage for removing that surplus water and reducing the quantity of salt.

Mr. SCOTT. How much will be necessary to carry that on this next year?

Mr. ELLIOTT. We want \$2,500 there; possible more.

Mr. SCOTT. Are there any other projects under way?

Mr. ELLIOTT. You mean those that are not completed?

Mr. SCOTT. Yes.

Mr. TRUE. Is not there some work in the State of Washington?

Mr. ELLIOTT. That has not been begun. They are asking that we give some advice in regard to the drainage of some swamp lands in Stevens County, Wash., which we want to take up. We are also asked—

Mr. SCOTT. I am not asking you now for projects that you are asked to take up. What I want to get at is those that you are now engaged on and must use more money on in order to complete, so as to realize the benefit of what you have already done.

Mr. ELLIOTT. Yes, sir; that, I think, covers those, with a few exceptions.

Mr. SCOTT. I understand the Dakota problem is practically completed?

Mr. ELLIOTT. Yes, sir.

Mr. SCOTT. And you will have that cleared out of the way before the 1st of July, so that you need not spend any more money on that?

Mr. ELLIOTT. Yes, sir.

Mr. SCOTT. I understand these are rough estimates, and you are not to be considered as bound by them; but you consider that you will need \$2,000 for the Utah project, \$2,000 for the Indiana swamp project, and \$2,500 each for South Carolina and Texas?

Mr. ELLIOTT. Yes, sir.

Mr. SCOTT. Now, are there any of these projects which could be dropped at this time without losing the results of work that has been already done?

Mr. ELLIOTT. The work already done would of course be of value so far as it goes, but we would not be able to give that advice that we expect to. The drainage work done in Utah is a unit in each case so far as it goes, but to determine what good will be accomplished we need to keep up observations upon each one along with new work that may be done.

Mr. SCOTT. It seems to me it was three years ago some one reported—I presume it was Mr. Mead—to this committee that his drainage work there had already practically demonstrated certain results, and they felt sure that the people could go on these lands and carry the work forward, applying the results to their individual farms; so we are surprised to find that it is still going on.

Mr. ELLIOTT. That was not known by this office. There was no work done there previous to last year. A very little the year before, by this office.

Mr. TRUE. Was that in Utah?

Mr. SCOTT. Yes; around Salt Lake, where they told us about the seepage and the rise in the alkali from the ditches high up along the hillside. The alkali had practically destroyed the value of their lands.

Mr. ELLIOTT. That was carried on by the Bureau of Soils.

Mr. SCOTT. By the Bureau of Soils, and not by the irrigation office?

Mr. TRUE. Yes, sir.

Mr. SCOTT. Is not this exactly the same kind of work?

Mr. ELLIOTT. This is the drainage of swamp lands—seeped lands.

The CHAIRMAN. The other is irrigation?

Mr. ELLIOTT. Yes, sir.

The CHAIRMAN. I did not know there were any swamp lands in Utah, except such as might have been rendered too wet by the seepage from ditches.

Mr. ELLIOTT. That is what this land is.

The CHAIRMAN. How does your problem differ from that of the Bureau of Soils?

Mr. ELLIOTT. The object is to remove the excess of water. Incidentally it is the same. Of course the alkali from the excess of water will be removed by the same process.

The CHAIRMAN. Is the Bureau of Soils still conducting its experiments?

Mr. ELLIOTT. I think they have completed it in Utah.

The CHAIRMAN. And you are carrying on practically the same things—

Mr. ELLIOTT. In a different way; yes, sir.

Mr. TRUE. I do not look at it as the same kind of work. The Bureau of Soils, as I understand it, has been demonstrating to the people near Salt Lake City a special method of removing alkali from the soil. They studied it with reference to the soil itself and the exact amount of alkali that it contains. We are going into this other region to make experiments with reference to a system of drainage for a very considerable district, and are simply making, in a small way, experimental efforts to determine what is the best system of drainage to recommend to those people.

Mr. SCOTT. Yes. I did not see offhand how the Soils Bureau could develop the system which would draw out the alkali from the soil without at the same time carrying off the water, and it looks to me as if it is a peculiar proposition that one of these bureaus should give its time to drawing off the alkali, which it can only do by drawing off the water, and then another bureau should go in and study the problem of drawing off the water, which will result in carrying off the alkali.

Mr. TRUE. The Bureau of Soils gives no attention to the engineering problems involved. We confine ourselves exclusively to that phase of the problem.

(At this point the committee took a recess until 2 o'clock p. m.)

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., February 15, 1906.

HON. J. W. WADSWORTH,

Chairman Committee on Agriculture, House of Representatives.

DEAR SIR: Since making a statement before your committee regarding the revenues of the agricultural experiment stations, I have received the completed report on the revenues of all the stations for the fiscal year ended June 30, 1905. This shows that 50 stations in 48 States and Territories received the Federal appropriation under the Hatch Act, amounting to \$720,000. In the case of one of the stations bills amounting to \$1,836.55 were disallowed, thus reducing the amount of the Federal appropriation actually expended by the stations to \$718,163.45.

In 27 States appropriations were made by the legislatures directly to the stations; in three States (New York, Minnesota, and Wisconsin) a portion of the appropriations made to the agricultural colleges were used for the stations connected with these colleges, and in one State (North Carolina) funds appropriated to the State board of agriculture were used for the station. In this way 31 States contributed to the maintenance of 34 stations an amount aggregating \$540,467.81. In three States individuals contributed to the stations amounts aggregating \$8,925.80. In 18 States the stations received under State laws fees for analyses of fertilizers, feeding stuffs, foods, creamery glassware, insecticides, fungicides, etc., amounts aggregating \$92,183.03. The receipts from the sale of farm products at 36 stations amounted to \$93,058. From miscellaneous sources the stations received \$72,169.59. The total revenues amounted to \$1,525,489.18, of which \$807,325.78 was derived from sources within the States. This is an increase of \$356,467.02 since 1900, when the aggregate revenues of the stations from sources within the States were \$450,858.71.

The table herewith shows the revenue of each station in 1905 from the Federal and State appropriations and other sources (including contributions of individuals, analyses of fertilizers, feeding stuffs, etc., sales of farm products, and miscellaneous sources).

This statement does not include the State appropriations made for buildings to be used jointly by the agricultural colleges and experiment stations.

Very respectfully, yours,

A. C. TRUE, *Director.*

AFTER RECESS.

WEDNESDAY, *February 21, 1906.*

The committee met, pursuant to adjournment, Hon. James W. Wadsworth (chairman) in the chair.

STATEMENT OF MR. L. O. HOWARD, ENTOMOLOGIST AND CHIEF OF THE BUREAU OF ENTOMOLOGY OF THE DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. If an appropriation is made in accordance with the provisions of the bill No. 14896, to quarantine the gypsy moth, how would you do it?

Mr. HOWARD. Taking the area as already mapped out under the present appropriation by the State of Massachusetts, showing the exact limitation, so far as they have found it, of the spread of the gypsy moth in Massachusetts, New Hampshire, and Rhode Island, around the boundaries of that area would probably have to be stationed a corps of inspectors at such distances apart as would have to be determined.

I have not planned this thing. This whole idea is an absolutely new one to me. It would require the service of a large corps of inspectors thoroughly familiar with the habits of the gypsy moth and his appearance in his different stages—thoroughly familiar with the appearance of the insect. Those men would act as scouts, to determine the exact stations on the boundary where the gypsy moth had reached, and then they could work toward the extermination of these exterior colonies; also as patrols in a way to prevent the spread of the insect by the hand of man. They would have to examine the trees along that line for a few miles constantly, because the insect is being carried, as Mr. Kirkland described to you in his speech the other day, by carts and on the persons of pedestrians and on trolley cars. The whole thing would be to prevent the spread by inspection, as far as possible, and to wipe out colonies already estab-

lished within the boundary lines; and it has a range, as he told you, from Seabrook, in New Hampshire, to Lowell, Mass., and then straight across the State of Massachusetts, including all that area, and also a little locality in the vicinity of Providence, R. I.

Would you like me to give you the more important reasons for doing this?

The CHAIRMAN. This bill is No. 14896?

Mr. HOWARD. The one on which you had the hearing the other day was not nearly so good a one as this. It included the brown-tail moth. I think it is absolutely impossible to hamper the spread of the brown-tail moth at the present time. The brown-tail moth, as you know, flies vigorously, and is carried by the high winds in the early autumn.

Mr. BOWIE. This last bill (H. R. 14896) is satisfactory to you in form?

Mr. HOWARD. This last bill is satisfactory to me in form, I should say.

Mr. BOWIE. And has been approved by you?

Mr. HOWARD. And I have a copy of a letter in my pocket which I wrote to the Secretary of Agriculture yesterday. He was to send it over, I think, to-day to the committee. May I put that letter in evidence now?

The CHAIRMAN. Yes; if you please.

The letter referred to is here inserted in the record, as follows:

FEBRUARY 19, 1906.

The Hon. the SECRETARY OF AGRICULTURE.

SIR: I am in receipt of your memorandum of February 19, asking me to prepare a report upon House bill No. 14896 of the first session of the Fifty-ninth Congress, introduced February 14. The bill in question seems to me to be a great improvement on the bill introduced earlier in the session by the same gentleman (Mr. Roberts, of Massachusetts). The former bill included the brown-tail moth with the gypsy moth, and aimed toward the extermination of both. The present bill omits the brown-tail moth and authorizes the Secretary of Agriculture to expend the appropriation mentioned to establish a quarantine against the further spread of this species.

While in my opinion it is now practically impossible to prevent absolutely further spread of the gypsy moth, it will, on the other hand, be possible to so seriously hamper its spread as to far more than justify the appropriation. Should the appropriation be made and should the \$250,000 be expended by work upon the present boundaries of the territory inhabited by this insect while the employees of the State of Massachusetts are working throughout the infested territory under the large State appropriation now in force, and which will continue for two years more, there is strong reason to hope that the result will be that the insect will practically be confined within its present limits, that it will be greatly reduced in numbers, and that it will be held in such check that the ultimate establishment and increase of the parasites now being introduced will do away with the present menace to the forests, orchards, and shade trees of western Massachusetts and the neighboring States.

It seems to me that it is a good policy for Congress to enable this Department, in the absence of a general quarantine law against injurious insects from foreign countries, to exterminate at the outset such pests accidentally introduced and before they have time to make an extended spread. This policy has never heretofore been adopted, and although the gypsy moth has been allowed to occupy very many square miles of territory in Massachusetts and to spread over the boundary slightly into New Hampshire and to establish itself in a restricted locality in Rhode Island, it is not too late to save the rest of the country, and an effort in this direction, supported by Congress and well directed, ought to be nearly if not quite effective.

It is easy to point out that if the General Government had been able to take such steps in the case of other introduced insects very great money losses could

have been saved. Thus, in 1896 I pointed out to the governor of Texas the strong desirability of the establishment of a quarantine in a very restricted portion of the southern part of that State, and drafted a bill for the purpose, which failed to pass the Texas legislature, although indorsed by the governor. Had that bill been passed and been put in force, or had Congress adopted legislation to that effect, it is safe to say that more than \$100,000,000 would have been saved at an expense not to exceed twenty thousand. In the same way, when Professor Comstock, at that time, entomologist of this Department, discovered the San Jose scale in Santa Clara County, Cal., in 1880, effective legislation would have enabled the destruction of the pest at an expense amounting to a very few thousand dollars and been a saving to the country of very many millions of dollars.

Very respectfully,

L. O. HOWARD,
Chief of Bureau.

Mr. HOWARD. I do not believe, Mr. Chairman, that this quarantine measure will absolutely prevent the spread of the gypsy moth, but I think that it will result in—

The CHAIRMAN. It is a very slow spreading insect?

Mr. HOWARD. Yes, sir; it is a very slow spreading insect. The female is a heavy-bodied thing with small wings, and the only way it can spread is by being carried in the caterpillar stage by pedestrians and vehicles, and so forth. It hangs down, you know, by a silken thread from the trees, and drops on everything that passes underneath, and is carried along the roads.

Mr. HENRY. Doctor, would you think it necessary to have any part of this appropriation made immediately available?

Mr. HOWARD. It would greatly increase the chances of success, because this appropriation at present would be available only on the 1st of July, and the gypsy moth caterpillars are hatched out in the month of May, and their spreading is in June.

Mr. BOWIE. You recommend that it be made available at once?

Mr. HOWARD. Yes, sir.

Mr. SCOTT. Have you made any estimate yourself as to the amount of money that could be economically used in this matter?

Mr. HOWARD. No, sir; the whole idea is a new one to me, and has only come up in the last few days.

Mr. SCOTT. Just one question, as to the possibility of securing scientists enough to do all the work that the Department is estimating. This year we have two what might be called new emergencies. Leaving out of account the cotton-boll weevil investigations, which must be employing a large number of scientific men, because they manage to absorb among them \$200,000 a year, we are now asked by various bills before this committee to appropriate \$200,000 and \$250,000 each to fight the gypsy moth and the cattle tick.

Mr. HOWARD. Yes, sir.

Mr. SCOTT. Would it be practicable, in your judgment, to find qualified men, the employment of whom would use up anything like the amount of money which they ask for to be appropriated under these two propositions?

Mr. HOWARD. Not all the employees would be required to be scientific men. There are at the present time in the graduating classes of the agricultural colleges of the United States a very large number of young men who have been especially trained in entomology. The demand that was made three years ago on the agricultural colleges for the cotton-boll weevil work seemed to put the professors of those colleges on their mettle to produce such men as were needed. We

had to rake over the agricultural colleges of the country with a fine-tooth comb at that time to get the men we needed. As you say, there are many of them engaged in that work.

We got probably 20 of these young men at that time who were practically and excellently trained in this rough school, and I think perhaps 50 or 75 men will be graduated in these colleges who are trained in these lines by the horticulturists of the institutions, and so on.

In the gypsy-moth work a great many of the employees in the quarantine and inspection work would not have to be scientific men. They would have to be men familiar with the appearance of the gypsy moth, which is something that could be picked up by any man of ordinary intelligence in a very short time.

Under the former work in the State of Massachusetts, which was described to you the other day, they had a large body of men who were all discharged when that work stopped.

Under the new bill the work is done generally by the State and the towns, and those town people appoint their own men, and politics come in to a great extent, and they employ men who do not do the work satisfactorily to Mr. Kirkland, who is in charge.

The CHAIRMAN. One other question. What further entomological work do you propose to do in the cotton-boll weevil investigation?

Mr. HOWARD. We should like to conduct large field experiments in the new territory.

The CHAIRMAN. What do you call entomological field experiments? It is proposed to divide this appropriation for the cotton-boll weevil, and give to the Bureau of Plant Industry specifically a portion of it and to the Bureau of Entomology specifically a portion of it. What do you propose to do with your portion of that?

Mr. HOWARD. That is the same division that was made last year.

The CHAIRMAN. It was not made by law last year, but it was made in the Department.

Mr. HOWARD. Yes; it was made in the Department.

The CHAIRMAN. Now, it is proposed in the estimate to make it by law.

Mr. HOWARD. You appropriated \$190,000 last year?

The CHAIRMAN. Yes.

Mr. HOWARD. And the Secretary of Agriculture asked Doctor Galloway and myself what proportions of that we could use. He gave Doctor Galloway \$95,000 of it and myself \$85,000, and in that way we used the appropriation.

We want to go on on the same lines that we worked on last year. There is this to be said about the new work in the new districts where we will work as well as in the old territory, that the habits of the insect are changing, and very many things respecting the new territory are of an entirely different character, climatically and agriculturally, from the old territory.

Mr. BOWIE. There are new problems presented every year in the conditions of the plants and the soils?

Mr. HOWARD. Yes, sir; precisely so. The cotton conditions of Louisiana are entirely different from those in Texas.

Mr. BOWIE. When do you expect the boll weevil, according to your ideas on this subject, to reach the Mississippi River?

Mr. HOWARD. About the end of next August.

Mr. BOWIE. This year?

Mr. HOWARD. Yes, sir.

Mr. BOWIE. So that you expect him really to cross the line and be in Mississippi before the end of this present year?

Mr. HOWARD. Yes; I believe so. I am reasonably confident, as much so as a man can be under such conditions, that it will cross the Mississippi River in September or October with its autumnal flight. That is the time of its principal spread—in the autumn.

Mr. BOWIE. It will not do a great deal of damage that late in the season this year, but it will lay the predicate for this trouble the following year?

Mr. HOWARD. Yes; and the year after. It takes about two years before it gets to its height in any given locality.

The CHAIRMAN. I do not quite get it through my head yet what entomological work you propose to do that has not to a certain extent been done already.

Mr. HOWARD. We know the full round of the life history of the insect in Texas up to the present time, but we find it has developed a capacity of resisting cold to a remarkable degree as it has proceeded north, and as it gets into a more northern locality the life cycle of the generation is retarded, and many things come up that have distinct value, and as we get into Louisiana we expect a hastening of the spreading and a greater relative destructiveness of the growing cotton.

Where cotton is grown on the uplands and the land is high and dry, the insect is killed out by the sun. It was reduced last year very largely by the midsummer drought.

The CHAIRMAN. What measures are you going to take against it?

Mr. HOWARD. We can not tell until we see what the result is. We must be informed about the life history of the insect.

The CHAIRMAN. You are simply studying the life and habits of the insect now?

Mr. HOWARD. We are studying it and following it up all the way as much as we can in the hope that we will get some light upon it. some clew——

The CHAIRMAN. Is it your idea that you will be able to find in the Mississippi Valley any natural parasite that will check it?

Mr. HOWARD. There is a possibility of it; a strong possibility of it.

The CHAIRMAN. You have not found any such thing in Louisiana or Texas?

Mr. HOWARD. No, sir; there are some things, some little flies, for instance, that attack it, but they do not seem to affect it at all.

The CHAIRMAN. Not sufficiently for any real purpose?

Mr. HOWARD. The study of natural enemies is a failure so far as any practical result goes.

STATEMENT OF MR. LOGAN W. PAGE, DIRECTOR, OFFICE OF PUBLIC ROADS, DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. Will you just go over the work that you are doing? Take your first item in the Book of Estimates, on page 43:

To enable the Secretary of Agriculture to make inquiries in regard to the systems of road management; to furnish expert advice on road building.

What have you done on those two lines? Please be as brief as you can. Have you a statement that you would like to read to us?

Mr. PAGE. I have presented a statement that covers practically all of those points.

The CHAIRMAN. Very well.

Mr. PAGE. I take this up clause by clause in that statement.

The CHAIRMAN. Suppose you run over that.

Mr. PAGE. Do you want me to say anything in regard to changes in the bill?

The CHAIRMAN. Just go over it in your own way.

Mr. PAGE. On page 43, the first item is—

To enable the Secretary of Agriculture to make inquiries in regard to the systems of road management.

A digest is now being prepared of the road laws of every State and Territory, with a special view to setting forth clearly the systems of road management provided by law, as well as to ascertain the limitations upon change in such systems and the authority for such changes as may be advisable. In addition to this, a work of much greater magnitude is being carried on for the purpose of ascertaining the amount of money expended in road improvement, the number of miles of common roads, the number of miles of improved roads, the number of men subject to labor tax, the rate of compensation per day, the amount of bond issues, and other information pertinent to the subject.

Now, I can give you an illustration of this inquiry in the State of New York, which has an aid law. Here also is the result for the State of Oregon, which has no State aid law. It has never been known how many miles of road there were in the United States or in any State, and I have given this under the head of "Total mileage." These data are collected from each county in the United States. The counties are given separately, and the number of miles of public road, and the number of miles of gravel and improved stone road, and the number of men subject to labor tax, and the total amount of money expended on the highways.

Mr. BOWIE. Have you got all your counties to report on that?

Mr. PAGE. No, sir.

The CHAIRMAN. From what do you get these statistics?

Mr. PAGE. From the counties. I have a road correspondent in every county in the United States. They work without compensation, and these correspondents are generally the county judges or one of the county commissioners. A great deal more money is being spent on public roads. As near as I can estimate now in the United States, outside of all corporate limits, over \$50,000,000 is being expended to maintain public roads.

Mr. BOWIE. Annually?

Mr. PAGE. Annually.

Mr. BOWIE. That is what you find out from incomplete estimates?

Mr. PAGE. So far as we have gone, about three-fourths of the country has been covered. In the State of New York over six millions is expended. In the State of Oregon nearly a million.

This data, when considered in connection with the systems of road management prescribed by law, will, by comparison with other systems and the results achieved by other systems, indicate clearly the weak point in the systems thus compared and afford a basis for

remedial action. It seemed to me that to investigate the systems of road management I had better find out just what they were and what was being done under those systems. It is the only way to tell just what is to be done. The next item in the bill is "to furnish expert advice on road building."

The office is carrying out the provision of the bill in regard to expert advice by cooperating in the construction of object-lesson roads; by sending out engineers and experts specially qualified to deliver addresses and advise with local organizations and county officials on the subject of road improvement; by detailing engineers to examine into local conditions and render expert advice concerning the kind of material best adapted for the improvement of a given road, the method of construction that should be adopted, and to make such surveys and estimates as the case may require; to point out to local officials the changes that would promote the efficiency of their road administration, and, where request is made, to outline such systems as are best calculated to give the desired results. It is the constant endeavor of the office to organize a corps of competent highway engineers qualified to meet all requirements and to place upon an adequate footing the corps of road experts, roller operators, and the equipment of machinery, in order that the greatest amount of work with the least expenditure of money may be accomplished.

The third point in the Book of Estimates is to make investigations in regard to the best methods of road making in the several States. That is almost a repetition. I requested that that should be stricken from the bill this year.

During the present fiscal year young engineers of the office have been detailed to make careful studies of the methods of road building employed in the Eastern States, and arrangements have been made whereby these young engineers could receive instruction in all the details of highway engineering as applied in the building of roads of the most improved types. In the construction of object-lesson roads the engineers of the office apply the knowledge gained by such investigations and also familiarize themselves with the methods in use in the particular locality in which they are working.

There are many sections of country practically devoid of natural hard road materials, and the office is endeavoring by means of investigations and experiments to devise some method of road construction that will answer the purpose in lieu of standard methods such as may be employed in States where hard materials are available. Among such forms of special construction may be mentioned sand clay, burnt clay, tar, oil, and oil residue, as well as special methods of treating earth roads.

In addition to the regular engineering and expert corps of the office, specially qualified engineers and experts along these several lines are employed from time to time as the case may require.

In connection with this experimental work that I am doing to get new methods of road construction, I have some figures here that show quite an interesting problem that has been taken up. We were requested to demonstrate in the Yazoo Valley how to build a road. They only had two or three hundred dollars to do it with, and there was not a hard road material within a hundred miles of the place, only clay. So we burned the clay and built a road that has proved very satisfactory.

I got such glowing reports from the local community that I wrote to the army engineer who was stationed on the levees there and asked him to go over the work and give me an accurate report of the results of this experiment, and he sent back even a more glowing report than the county officials, and I learn now that they have appro-

apropriated \$2,500—they started with three or four hundred—to continue the work.

Mr. SCOTT. When you burn that clay do you crush it and pound it down and roll it the way you do rock?

Mr. PAGE. Exactly the same way. Here are some photographs showing the work right from start to finish [indicating photographs].

The next provision in the bill is to make investigations in regard to the best kinds of road-making materials in the several States.

In order to carry out this provision of the bill in a manner that would be at all adequate or serviceable to the public, it would be necessary to employ a force of geologists to make road-material surveys of every county in the United States and prepare charts or maps showing location, character, and quantities of material. The appropriation hitherto available has been entirely inadequate for such work, and it has therefore not been attempted, although it is thought that the laboratory work of the office answers the same purpose in a limited sense, as information is given concerning such samples as are sent in to the laboratory.

I think that is all that need ever be done. If anybody wants a particular road material tested, they can get it done. There is no use in making a survey of the whole United States, as it would require a larger corps of men than are in the Geological Survey. The amended provision includes all that is necessary.

The next provision of the bill is, to investigate the chemical and physical character of road materials:

The routine testing of road materials has been carried on along the same lines as heretofore, and a comparison of the records indicate that during the present fiscal year the volume of work was fully 40 per cent greater than during the past fiscal year. In addition to the routine testing a very large number of requests have been received for the testing of clays, wood blocks, concrete, gravel, building materials, and asphalt. It has been possible to do very little of this special testing work owing to our limited facilities.

The next provision of the bill is for the employment of local and special agents, clerks, assistants, and other labor required in the city of Washington and elsewhere. In regard to this I say:

Work has been carried on with the smallest force compatible with the good of the service.

I think it is hardly necessary to say anything further.

The CHAIRMAN. You have not come to the new items yet.

Mr. PAGE. That was simply the bill as carried out, or as I am attempting to carry it out this year.

The CHAIRMAN. Take this item, which reads:

To make investigations in regard to methods of road making, and to demonstrate the same.

You have been demonstrating?

Mr. PAGE. I have been all along, and you may remember last year I went into considerable detail in discussing that matter with the committee.

The CHAIRMAN. Yes. Have you met with any cooperation on the part of the localities?

Mr. PAGE. Yes, sir.

The CHAIRMAN. What have you furnished in making those demonstrations?

Mr. PAGE. We furnish an engineer and an expert road-machine operator. That is everything we furnish. We do not build roads. We simply cooperate with local communities, and whenever inform-

tion is requested in regard to this phase of the work we have a circular we send which explains all details fully. They are to provide all material, rough labor, and fuel, and pay all incidental expenses.

The CHAIRMAN. You just furnish the expert?

Mr. PAGE. Simply the expert advice.

Mr. BOWIE. You do furnish the machinery, do you not?

Mr. PAGE. Yes, sir; we furnish the machinery. We have not, up to the present time. We have been borrowing it.

The CHAIRMAN. Do you furnish the road scrapers?

Mr. PAGE. When they have not got them. We have not up to the present time. We have been borrowing them from the manufacturers. And I have particularly requested this year that that be done away with, and that we be allowed to rent and supply what machinery is necessary to demonstrate modern methods of road building.

The CHAIRMAN. Why is it not just as well to have the manufacturers furnish them? They will do it as an advertisement for their machines?

Mr. PAGE. Exactly; and that is where the trouble lies. They send their agents on the ground and advertise and try to sell these machines while we are at work, and as long as we borrow we can not stop them from doing this. If we rent them, we can rent at an exceedingly low rate—about 5 per cent of their wholesale price, for a steam roller, for instance, a year.

The CHAIRMAN. Yes; but your transportation would be something.

Mr. PAGE. That is another matter I wish to emphasize. We have been getting our transportation free of charge heretofore, and I have also requested sufficient appropriation to pay for our transportation. We are begging the railroads for our transportation, as it has been done in the past—we are getting these applications from all over the country to build object-lesson roads—and we have to write to the railroad presidents and beg them to give us trip passes for our engineers and experts, and free transportation for our machinery.

Mr. LAMB. They will not do that, will they?

Mr. PAGE. Certainly they will, with the exception of one or two of the roads. The Pennsylvania Railroad is about the only one that does not.

The CHAIRMAN. Does not what?

Mr. PAGE. Give us free transportation. The Baltimore and Ohio has now stopped it. There are only those two roads. All the rest give us free transportation.

The CHAIRMAN. All the roads going north from here—

Mr. PAGE. None of the roads going north. The southern and western roads.

Mr. BOWIE. They have taken a considerable interest in this good-roads movement.

Mr. PAGE. Yes. It is directly to their advantage.

Mr. SCOTT. Do you furnish expert assistance and advice wherever it is asked for?

Mr. PAGE. When we can. We can not possibly comply with all the requests we receive.

Mr. BOWIE. What percentage can you comply with?

Mr. PAGE. Less than 10 per cent. Last summer I succeeded in keeping up to 10 per cent, but now it is dropping far below that.

The CHAIRMAN. What do you mean by this language in the bill, "Materials of construction relating to agriculture?"

Mr. PAGE. Last year, the first of July, the Office of Public Road Inquiries was combined with the Division of Tests, under the name of the Office of Public Roads. In the Division of Tests we tested all the road materials and any other materials of construction relating to agriculture that might be sent in to the Department to be tested. We have all the machinery necessary for making general tests and we have done it all along. Any kind of wood, concrete, iron, etc., that is sent in the Department tests it.

The CHAIRMAN. Test it in what way?

Mr. PAGE. Test its strength.

The CHAIRMAN. Now, that is being done by Mr. Pinchot?

Mr. PAGE. Yes; I started it for Mr. Pinchot.

The CHAIRMAN. Why do you do it? Mr. Pinchot is asking a large appropriation and is going to set aside quite a large sum from his appropriation for that.

Mr. PAGE. I started the work and carried it on for several years and gave him one of my engineers to continue it, because I did not have the facilities for carrying it on on the scale that he wants it done.

The CHAIRMAN. Why do you want to do it and carry it on now?

Mr. PAGE. His is a special investigation of the different species of wood, including preservative treatments.

The CHAIRMAN. All kinds, he says.

Mr. PAGE. I suppose eventually he will take up all kinds. He has so far been working on long-leaf pine and Oregon pine; that is, until quite recently. His is a different scheme altogether. As a matter of fact, we test very little wood. We test concrete and wire—fence wire—and cast iron, and anything of that description that happens to come in, that is used for agricultural purposes.

The CHAIRMAN. How does it come in?

Mr. PAGE. It comes in through special requests to the Secretary. Anything he desires tested we test. Anyone who desires anything tested that the Secretary thinks of sufficient importance, he will refer to our laboratory with the request that it be tested. This morning, just before I was called to this committee, the chief clerk of the Department telephoned to know if we could test some chair legs, and I suppose he sent them over, if he considered it worth while.

The other Departments call on us for tests also. We have tested for the Treasury Department, the War Department, etc.

The CHAIRMAN. For the Government, or individuals?

Mr. PAGE. For the Government.

The CHAIRMAN. Were these chair legs for the Government?

Mr. PAGE. I do not know anything about them. I had to come over here before ascertaining. In a matter like that it would take probably fifteen or twenty minutes to make such a test.

The CHAIRMAN. The idea of the Government doing that sort of thing. It seems extraordinary.

Mr. SCOTT. I think I understand this. Mr. Pinchot is doing research work and—

Mr. PAGE. They are conducting an investigation of different types of wood. The general testing we do not do for individuals unless the Secretary of Agriculture desires it done.

The CHAIRMAN. You open a large door if you permit that kind of thing.

Mr. PAGE. He requested us last year to make an investigation as to the use of reinforced concrete for fence posts, and we did that and published a bulletin on the subject; we also gave general instruction to farmers—how to use concrete in farm work. We also undertook an investigation of the deterioration of modern fence wire. We published a bulletin on the subject that gives the reasons for the quick decay of modern fence wire.

The CHAIRMAN. The competition has been so keen that they simply put in poor stuff; is not that the result of your bulletin, really, in so many words?

Mr. PAGE. The telephone and telegraph companies get good wire, but the farmer has no way of testing it. That investigation Dr. A. S. Cushman conducted, at his own expense, largely during his summer vacation.

The CHAIRMAN. What did you find that they put into the wire?

Mr. PAGE. There are two reasons for the rapid rusting of modern fence wire. One is the thin galvanized coating that is put on, and another is the character of the metal itself. In the open hearth and Bessemer methods of manufacturing steel that are now so largely used they put in manganese, for the reason that it enables them to handle their blooms more quickly, and it draws better in the rolls if manganese is present. They could not possibly go back to the old puddling methods. Farmers used to pay 14 or 17 cents a pound for wire. The farmers want it cheap, and are asking for cheaper wire, and they are getting it. I have a piece of the first barbed wire ever made, thirty-odd years ago, and it has been exposed to the weather for that entire time.

Mr. HENRY. Was this made at Worcester?

Mr. PAGE. No, sir; a man in Wisconsin made it. I do not remember his name. He twisted it between trees, using an old grindstone for the purpose, and he had boys go along and stick the barbs in it. It is in good condition now.

Mr. LAMB. How long will it last now?

Mr. PAGE. Rarely over five years.

Mr. SCOTT. It depends on where it is. It lasts longer in a dry country.

Mr. PAGE. Yes, sir; and nearness to cities makes a great difference. The acid in the coal gas has a great effect on it.

The CHAIRMAN. On page 44 it says: "And to comply with requests for object-lesson road making, including the training of engineering students in highway engineering."

Mr. PAGE. Yes, sir; that, and also to do away with soliciting railroads to give us free transportation and passes, and the manufacturers to lend machinery.

Mr. SCOTT. How much do you estimate will cover those last two items?

Mr. PAGE. The renting of the machinery?

Mr. SCOTT. And transportation.

Mr. PAGE. To pay all the freight on machinery, about \$6,600. That is an estimate of the freight expense, based on a maximum of 10 outfits, each requiring three cars, and constructing during the

season four sections of road, with an average haul of 200 miles to each section of road.

The CHAIRMAN. I am afraid you are going to branch out and do just what we do not want done in this road-making business. There will be no end to the demand for demonstrations if we give way to it. We simply could not supply it with a million dollars.

Mr. PAGE. Yes, we could. The Eastern States have very little use for it, nor have the State-aid States. In such States we simply co-operate with the commissioners and engineers and give them information.

The CHAIRMAN. If the States want to take this up, why do they not do it?

Mr. PAGE. They do. We have nothing to do with such States.

The CHAIRMAN. Why interfere with this at all? Why do not the States take care of this? It is the same story with every one of these investigations.

Mr. PAGE. It is exactly like the case of the gypsy moth, recently discussed, and all the other work of the Department.

Mr. SCOTT. Suppose that a given stretch of road had been let by a county to a contractor to be constructed according to certain plans and specifications, would you entertain a request to send an expert to oversee the construction of a road under such conditions?

Mr. PAGE. No, sir; we could not supervise the work of a contractor. We will look over the specifications and say whether we think the specifications are all right.

The CHAIRMAN. My, but that is motherly and fatherly and paternal—looking over a man's specifications and contract.

Mr. PAGE. It is a different problem on the public road. It is not only the local community that uses that road; the public in general uses it.

(Informal conversation followed; not reported.)

The CHAIRMAN. You want \$30,000 increase?

Mr. PAGE. An increase of \$30,000.

The CHAIRMAN. Yes; it was \$50,000 before, and now you are asking \$80,000?

Mr. PAGE. Yes.

(Informal conversation followed.)

Mr. PAGE. We do not advocate any type of road. We show communities how to improve any kind of road and we make our plans according to what they want to spend, and we do not advocate their spending more than they want to; and then we show them by the best known methods how to improve the particular roads. We endeavor to get at the county officials, the ones who have charge of construction, and show them how to manage their road systems—that is, their county administration, and how to prepare the road, and when they have any roads to build just how to build them. We show them how to use the machinery and select materials; we inspect road materials and test their quality.

The CHAIRMAN. I think we understand what you are doing. You want to do more of it. You want \$30,000 more for work along the same lines, principally?

Mr. PAGE. No, sir; I want to pay my way. I do not want to be soliciting railroads to carry men and machinery free, and to be asking the road-machinery manufacturers to lend their machinery for the work. I think it undignified for a Government office to do so, and I

think the good we do would be greatly enhanced if we paid our own way.

Mr. LAMB. Do you not think if you went around in the country contiguous here and demonstrated your work with the road materials and sent out the bulletins that that would be education enough?

Mr. PAGE. No, sir; that would teach nothing in regard to road construction.

Mr. LAMB. Why not? If you explained it on the roads around here and then sent out your instructions, and at the same time are carrying on the experimenting with road materials and sending out your bulletins, would not that give everybody an object lesson?

Mr. PAGE. No, sir. Take, for instance, Jackson, Tenn. Four or five years ago a section of object-lesson road was constructed there, and the people are now spending over \$300,000 on their county roads, and they have now the best roads in the State.

(Informal conversation followed; not reported.)

Mr. PAGE. You can not tell a person how to build a road any more than to build a house. You can tell him he has a very good variety of brick, but he will not know how to build a house out of it. You have got to show him how the house is to be built. In the Eastern States here, particularly the Northeastern States, they have road engineers in nearly all the counties, men who are trained to a considerable extent and know how to go about road building, but it is different in other sections.

The CHAIRMAN. Sometimes the best way to teach people is by experience. The best way sometimes is to let them suffer. Let them suffer from bad roads if they want to. It looks to me like an endless task to go all over this country and demonstrate.

Mr. SCOTT. Can not the process of making a road be put into words?

The CHAIRMAN. It is simple enough.

Mr. PAGE. No, sir.

Mr. SCOTT. In other words, if you are asked to oversee the construction of a road in Kansas, could you not get them to send you the material which they proposed to build it out of and give you an idea of the topography, and could not a man sitting right in your office tell them in words which they could understand how to build that road?

Mr. PAGE. No, sir. You have got to make a study of the local conditions. You could build a road, but as to whether it would be done economically or by the best method would be a different thing. I think it would be impossible.

Mr. LAMB. What is the minimum cost for a good road?

Mr. PAGE. That is exactly like asking what is the minimum cost for a good house.

Mr. BOWIE. I would like to have put into the record how much it would cost in New York for a road.

The CHAIRMAN. Mr. Gibson, please read that quotation.

(The clerk of the committee read the quotation referred to, page 94 of Bulletin No. 10, of the department of the State engineer and surveyor of the State of New York:)

SECOND-CLASS ROADS.

The cost, including engineering, advertising, and all expenses, of improving the 700 miles of road already constructed and under contract under the Higbie-

Armstrong law has been about \$8,000 per mile. The cost of 424 miles of completed macadam-surfaced roads alone is about \$8,500 per mile. The cost of the gravel and shale-surfaced roads alone is about \$2,000 to \$5,000 per mile.

Mr. PAGE. In Massachusetts, where I worked for seven years, the State has been building roads ever since 1893, and now they are beginning to need very considerable repairs, and they are asking the legislature to make separate appropriations for repairing and maintaining these roads.

The CHAIRMAN. Put this into the record, Mr. Stenographer. It has been found that the cost of these roads and keeping them in repair is an average of \$400 per mile per annum, and that already the localities are refusing to expend that amount of money and are turning to the State and saying, "You built these roads; you keep them in repair." And there is already pending, or was pending last winter, before the legislature a bill providing for a State corps of road supervisors and engineers, who should go on and repair these roads at the cost of the State and then assess the cost back on the locality. We all know how soon that assessment back will be forgotten, and there you have State ownership of the roads.

Mr. HENRY. What difference does it make who pays the bill—whether it is paid by the local authorities or by the State? The people want the roads and are going to have them. They are building all through New England hundreds of miles of stone and gravel roads every year, and the matter of keeping them in repair is not serious if you keep them as they ought to be. If you let them go for several years and neglect them, there is of course quite an expense.

The CHAIRMAN. That shows what the tendency would be.

Mr. HENRY. I think it would be the better plan to have the State take care of the roads.

The CHAIRMAN. All the roads?

Mr. HENRY. The public thoroughfares.

The CHAIRMAN. Mr. Page, is there anything further special that you want to say? I think we understand your position thoroughly.

Mr. PAGE. Of course I have nothing to do with the lawmaking, I am simply trying to carry out the provisions of this bill to the best of my ability, and I think we are doing good and useful work. I think the roads are being improved throughout the country partly through our efforts.

The CHAIRMAN. I think they are so, too. But I think you are doing work enough.

Mr. PAGE. Wherever we have demonstrated in almost every instance the roads in that locality have greatly improved. Our work is purely educational.

The CHAIRMAN. Your reason for the increase in this item is that you want to pay for transportation on railroads, which is now denied you?

Mr. PAGE. Not denied me. It is given to me now.

The CHAIRMAN. You want that because they will no longer carry your material?

Mr. PAGE. No, sir; I consider it good policy not to be begging it of them.

The CHAIRMAN. I thought you said some of them declined it.

Mr. PAGE. Only two of them.

(At 3.30 o'clock p. m., the committee adjourned until to-morrow, Thursday, February 22, 1906, at 10.30 o'clock a. m.)



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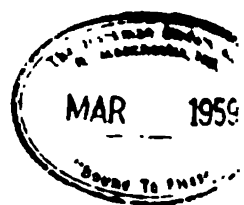
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